IST 507427

SAFIR

Business Models
for SAFIR application
Information Center EHS

Economic Use
of EU Project SAFIR

BASF IT Services BASF Group	DATE	FORMAT / SIZE	PAGE
	10-Apr-2005 Confidential!	**A4**	**1/22**

TABLE OF CONTENTS

TABLE OF FIGURES

1. MARKET POTENTIAL FOR THE SAFIR APPLICATION INFORMATION CENTER EHS

This is a shooting copy as basis and discussion platform for a later, well-elaborated business plan for the later commercialization of the Information Center EHS[1] (abbreviation used in the following: ICE) developments, but still a draft.

As more detailed described in chapter 2.3 (Easy SAP EHS access for industrial emergency response forces already using SAP EHS) we will phase the chemical industry customer domain first. We plan to rollout the related commercialization process step by step until we can provide at the end also the governmental (resp. public) domain.

Background for this is, that the overall effort increases in every of this commercialization steps.

The first customers we plan to address are those with an already running SAP[2] EHS[3] application, which could be used as backend database (in SAFIR ICE[4] deliverables called: Service Provider). We are able to provide this group of customers with a very sophisticated and voice-activated client application (inclusive the technique to set up the related server-client environment).

In contrary to the first mentioned users (with an own SAP EHS) the finally addressed customer base requires a fully outsourced backend Service Provider, who takes care of everything (inclusive the final data maintenance). These are the customers (resp. the business model) described so far in the WP4 deliverables.

<u>Keeping this mind the following figures are of special interest:</u>

In total there are in Germany nearly 1,900 chemical businesses with altogether 443.000 employees with 148,6 billion € revenue (see also Figure 5 and Figure 6).[5] Among them you can find 250 chemical companies (with more than 200 million € revenue) with an own SAP R/3 implementation running that could be used as Service Provider for application ICE. All these companies in Germany have to run own emergency response forces that could be supplied with technology state of the art.

If extrapolated worldwide this increases up to an enormous market potential of several thousand potential customers just in the chemical industrial domain.

The EU[6] chemical industry (excluding pharmaceuticals) comprised 2003 about 27 000 enterprises (data covering firms with no employees are excluded), 96% of which have less than 250 employees and may be considered as small and medium-sized enterprises. These account for 30% of sales and 37% of employment. Only 4% of the EU enterprises employ more than 249 employees and generate 70% of total chemicals sales (please also see Figure 9: Number of chemical companies in the EU by size-class).

---

[1] Environment, Health & Safety

2 Systems/Applications/Products within data processing – company that sells the leading suite of large-scale client-server business software (http://www.sap.com/)

3 SAP Software module to handle Environment, Health & Safety related aspects in industrial companies

4 Information Center EHS

5Some 90 percent of these undertakings are small and mid-sized enterprises (SMEs) with fewer than 500 staff. Source: VCI (http://www.vci.de/template_downloads/tmp_0/Branche_EN05.pdf?DokNr=66209&p=101)

6 Unless specified, chemical industry includes pharmaceuticals. Unless specified, EU concerns EU 25.

As can be seen on Figure 10: Number of employees the in chemical industry and Figure 11: Gross revenues of the chemical industry per country this market potential in the chemical industry is even bigger. In addition to the industry sector we see also a quite big economic potential in the governmental domain. This was already impressively confirmed by Jay Brummett, Chief Technology Officer and responsible for the IT of a network of medium-sized US American cities.[7]

For more details please check the next chapters and the already presented WP1, 4, 7, 9.1, 12.4 and 14 deliverables.

2. POTENTIAL CUSTOMERS DIFFERENTIATED BY CUSTOMER LAYERS

Customers are classified in several types according to several criteria. At this point of time we mainly differentiate potential customers regarding the necessary effort to deliver adequate ICE related solutions. A customer that already runs an own SAP EHS database can easily be supplied with a suitable frontend apllication, whereas a potential user without any preexisting database could require eventually even a hosted solution. Finally we aim to supply all these types of users. Just to estimate who we are able to supply first, we think it makes sense to seprate the potential user market into concerning segments as described below.

2.1 Customers that require "hosted EHS data"

Customer types 1 have a demand for accurate EHS data on site, but do not host an own EHS application. They are pure users of hazardous substance related information. Externally "hosted EHS data" would be ideally for those customer type. These are the users that make use of a final ICE solution as described within the WP4 deliverables.

2.2 Customers that require a "full solution (incl. a new EHS database "from scratch")

Customer types 2 have also no own EHS application running yet. These emergency forces however do not require "hosted EHS data", but a system running on own servers. BSPP[8] is a typical related potential customer, who intends to use distinct EHS servers on site (on their fire trucks). A "full solution" (incl. a new EHS database "from scratch") would enable them to be in an emergency mission completely independent from any outside/external remote connection.

2.3 Easy SAP EHS access for industrial emergency response forces already using SAP EHS

Customer types 3 are industry fire brigades (e.g. BASF) with an already existing SAP EHS database, which could use the SAFIR ICE application. Typical such a customer is BASF fire brigade, which has a demand for an easy and fast access to the BASF SDSs (BASIS).

---

[7] At the SAFIR User Advisory Board Meeting 11.2005 and as documented towards the SAFIR management., see also: http://www.ci.ogden.ut.us/press.pr_185.html

[8] Paris Fire Brigade (French Brigade des Sapeurs-Pompiers de Paris, BSPP) http://en.wikipedia.org/wiki/Paris_Fire_Brigade

Business background (BASF use case[9]):

Current process, when BASF fire control unit requires hazardous substances data:

1. The control unit officer logs in into the SAP system ("BASIS").
2. He identifies a substance in the SAP "Specification Information System" (via transaction cg04).
3. Here he selects the required substance from the hit list (real substance).

4. In the SAP Report Information System he selects the most suitable Safety Data Sheet (SDS[10]). During the whole process the SAP typical, partly quite "bulky" dialogs interfere and hinder especially SAP unexercised users.
5. The user opens MS Word and prints the report. The process of filling the data into the SDS is implemented using related macros. For this purpose SAP modified MS Word.
6. This results in pop-ups checking if the user is willing to activate macros and so on. Based on experience users tend to refuse such requests. As a result the related report is not always filled completely with all data available.

In this respect the **following enhancements** of our Java application could give suitable assistance:

- All ICE functionalities as described so far, e.g.:
  - Enhanced search functions using ICE (identifiers)
  - ABAP[11] report for the SDS output (best directly on the printer)

[9] For more details please check regarding WP1, WP9.1 and WP12.4 deliverables

[10] A Safety Data Sheet (SDS) is designed to provide both workers and emergency personnel with the proper procedures for handling or working with a particular substance. SDS's include information such as physical data (melting point, boiling point, flash point etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill/leak procedures. These are of particular use if a spill or other accident occurs.

[11] SAP development language (ABAP: Advanced Business Application Programming)

2.4 First estimations (size of related industrial market)[12]

- In a typical BASF plant an average of 3 users
- Assuming the same problematic affects 50 plants within BASF a first extrapolation (to be verified) would lead to a potential number of users of 150[13]
- Assuming 20 other targeted companies like BASF[14], this would mean 3.000 potential users
- Assuming 500 smaller companies (average 10 users): 5.000 potential additional users[15]

A first level judgment of the expenditures and financial spending necessary to use ICE:

- Initial project to enable an existing EHS database as Service Provider: around 20 man-days
- SAFIR inside run time license
- BlueVQL-Headset
- Tablet PC or SmartTalk
- x% for the Channel on SW, HW to be defined more strictly on Volume

2.5 Present BIS Industrial customer domain

At the time being BASF IT Services supplies the industrial user domain (mainly within the chemical industry) with know how and applications around the SAP module EHS. On top of the potential users as already described also these types of users could benefit from technology developed in the project SAFIR (especially as it is quite easy to address this already established clientele).

Background is that also current SAP EHS users have (at least partly) a demand for an easier SAP EHS data and report access. Exactly that is what we intend to provide and develop within the EU project SAFIR: an easy, voice-activated access to enhanced EHS data.

Such an "easy access" to SAP SAP R/3 would enrich the enviLution[16] product-line by new components. Imaginably are products like the following:

- "enviLution easy SAP access"
- "enviLution vocal SAP access"

[12] Calculate carefully on basis of BASF requirements

[13] A first BASF IT Services' internal estimation

[14] A first BASF IT Services' internal estimation

[15] A first BASF IT Services' internal estimation

[16] The brand name "enviLution" is used for a sophisticated template on top of SAP EHS (developed by BASF IT Swervices: http://www.basf-it-services.com/itr/BISInternet/Internet_EU/en_GB/portal/show/content/Prins/services/ehs/envilution)

3. PROCEEDING / NEXT STEPS IN THE PROJECT SAFIR

This chapter sketches shortly the potential steps of BIS[17] within the second phase of the EU project SAFIR, from M19 (09.2005) up to M48 (02.2008).

SAFIR project steps 1 to 3: We enable plant fire brigades (of chemical industry companies) to get access to the EHS data persisting in their company owned ERP[18]/SAP system in a suitable way.

For this purpose we implement on top of the voice-activated Java application ICE (as developed in the first project phase) an enhanced ICE graphical parallel to the voice user interface (all in Java). One aim is to speed up the whole process of identifying a hazardous substance up to the "print" of the related SDS[19]. Another aim is to add features specific to emergency response forces. Such features could be access to further applicable information available, e.g. location based data as the fire brigade list or similar.

If required we also can enhance the queried data sources. For example we can add ERICard properties and data and appropriate additional ones (e.g. physical-chemical data), a specific property tree or similar. If required we add properties and support the customer in updating the related data.

Additional requested information is the volume of chemical stored in one specific site: tank, warehouse, truck parking lot and railway tanks…

SAFIR project step 4: Fully centrally hosted EHS data. No user own SAP EHS system required. One main Service Provider supplies all EHS relevant information. This corresponds to the business model and system architecture as described in the M18 deliverables so far.

3.1 SAFIR Project Step 1 (User Type 2.3)

Precondition: User (plant fire brigade) runs own or have access to a fully maintained SAP EHS system

Using a Java application with a suitable graphical or voice user interface (GUI or VUI[20])

Aim is to make the data access and processing easier:

Input via ICE GUI/VUI (Java): Identification (via UN number[21] or similar: TBD[22])

- ➔ Data input (identification) and output optionally via GUI or VUI
- ➔ Two or three fields for the input of UN number, CAS number[23] etc.

---

[17] BIS: BASF IT Services

[18] ERP (Enterprise Resource Planning): integrated business management system (includes all aspects and computerization methods that are needed to effectively plan and manage a business)

[19] A Safety Data Sheet (SDS) is designed to provide both workers and emergency personnel with the proper procedures for handling or working with a particular substance (for details please check footnote 10).

[20] GUI: graphical user interface, VUI: voical user interface

[21] UN numbers or UN IDs are four-digit numbers that identify dangerous goods hazardous substances and articles (such as explosives, flammable liquids, toxic substances, etc.) in the framework of international transport. Some hazardous substances have their own UN numbers (e.g. acrylamide has UN2074), while sometimes groups of chemicals or products with similar properties receive a common UN number (e.g. flammable liquid, not otherwise specified, have UN1993). A chemical in its solid state may receive a different UN number than the liquid phase if their hazardous properties differ significantly; substances with different levels of purity may also receive different UN numbers (http://en.wikipedia.org/wiki/UN_number).

[22] TBD: to be defined accurately (in process at the moment regarding real user requirements)

[23] Chemical Abstracts Service (CAS) is a division of the American Chemical Society that produces the Chemical Abstracts, an index of the scientific literature in chemistry and related fields. CAS also

- ➔ A field that list possible properties
- ➔ Start query --> button for the results

Output of the data via printed SDS (hardcopy).

3.2 SAFIR Project Step 2 (User Type 2.3)

Precondition: User runs runs own or have access to a fully maintained SAP EHS system

Data input (identification) and output via ICE graphical or voice user interface (GUI or VUI[24]) using ICE:

Enhance the queried SAP EHS system:

- ➔ New property tree[25] (Z_SAFIR)
- ➔ New Properties (adapted to fire fighter needs)

Data can be given back via voice and/or graphical.
Optionally also the related SDS can be shown on the display.

3.3 SAFIR Project Step 3 (User Type 2.3)

Precondition: User runs own, fully maintained SAP EHS system

New Hardware for each fire fighter --> for external use “fire forces in the field”

- ➔ Full vocal guidance (in- and output) “hands and eyes free”
- ➔ Pre-download of suitable data subset
- ➔ Synchronization whenever required
- ➔ In future release: decentralize maintenance of location-based data
  (like fire key, risk matrix on site as the BASF fire brigade list or similar)

---

maintains the CAS registry, a comprehensive database of chemical substances. Each substance in this database receives a CAS registry number, and these numbers are now commonly used to uniquely identify chemical substances. Substances also receive unique CA index names, which are normally constructed using rigid nomenclature rules. In an effort to facilitate searching for related compounds, the most important functional groups of a substance are named first, followed by their modifications; there are also some other differences between CA index names and IUPAC names (http://en.wikipedia.org/wiki/Chemical_Abstracts_Service).

[24] GUI: graphical user interface, VUI: voical user interface

[25] SAP EHS (Environment, Health and Safety): The details on a specification in the form of numeric values or textual information (“properties”) can be grouped in so-called “property trees”

3.4 SAFIR Project Step 4 (User Type 2.4)

Precondition: User runs own, fully maintained SAP EHS system

Exploitation of the SAFIR ICE technology for industrial customers (present SAP EHS users within the chemical industry to provide them with an easier SAP EHS data and report access (easy graphical and/ or vocal SAP access).

3.5 SAFIR Project Step 5 (User Type 2.1)

No precondition: User has NOT to run an own, fully maintained SAP EHS system

The full ICE features (as described in chapter 3.3) made available for external civil security forces (e.g. municipal fire brigades) without an own SAP system:

➔ SAFIR "Information Center EHS" (ICE) as so far documented (in SAFIR WP4 deliverables)

➔ Hosting of one central Service Provider for all (as described in the SAFIR M18 deliverables)

3.6 SAFIR Project Step 6 (User Type 2.2)

No precondition: User has NOT to run an own, fully maintained SAP EHS system

Same scenario as in step 5 (chapter 3.5) with full ICE features for external civil security forces, but with an own database "on site", e.g. for BSPP (see chapter 2.2Customers that require a "full solution (incl. a new EHS database "from scratch")).

4. CONCLUSION

The exploitation of the technology developed within the EU project SAFIR starts with a combination of project and solution. The "plug and play" solution "out of the box" with centrally hosted hazardous substance data will most likely be realized not before a substantiate market potential can be ensured. Nevertheless this document shows a series of applications that could help to disseminate and exploit the SAFIR ICE technology anyhow ("ICE light").

On top there is a remarkable potential for a simplified and enhanced access to the ERP software provided by SAP[26]. That would help existing SAP EHS users to access the maintained EHS data without using the inconvenient proprietary SAP GUI. Such a feature would make sense not only for untrained users.

Like in our standard business (outside SAFIR) we sell industrial customers a solution and adapt it to their needs. Normally this is a template for his SAP ERP system inclusive the required customizing etc. (enviLution business model).

Our temporary, rough plan for the "Go to Market" so far could look like in the following described:

1. Start to act as a Service Provider in a later stage of the project. First we could start with customers with an already existing EHS database (divided into project and solution part). This helps to benefit from the EHS data on the customer's ERP system. We will make them available for his emergency response forces (project part) in a very convenient and voice-activated way (solution part).

[26] Systems/Applications/Products within data processing – company that sells the leading suite of large-scale client-server business software (http://www.sap.com/)

2. For customer's like BSPP in Paris (more detailed described in chapter 2.2 [Customers that require a “full solution (incl. a new EHS database “from scratch”) we also might set up a fully new system "from scratch" without considering an existing EHS database. Aim is to enable them to transport their server on their fire brigade trucks inclusive an up-to-date full download of all available EHS data sets. Or to have an access to this server with a suitable communication link (security, speed…)

3. In a later stage we can also host a central system by ourselves (as described in our documentations so far). This would be such a "plug and play" solution "out of the box". Maybe the European Chemicals Association (CEFIC) instead of BIS can host it. But that is not finalized yet.

<u>That means we have to split our market efforts/business plan into the two parts</u>

1. Customer specific project and
2. Voice-activated Java-solution.

"Customer specific" means that we cannot measure the efforts in advance. If you take the BASF fire brigades (as customer) the main project part would be necessary for example only once (carried out in the company headquarter in Ludwigshafen). Later (in the company-wide rollout) we would have just some adaptations. And on top the project we could sell the licenses for the related solution itself (ICE, license per workstation).

Additionally to these emergency response customers we intend to use the SAFIR know-how also to enrich our BIS product range (of SAP EHS templates and tools) with a new solution "SAFIR EHS on the go". That means also for our present industry customer domain. But also here it is difficult to make a serious estimation of the related market.

5. FORESEEN MARKET POTENTIAL FOR SAFIR ICE TECHNOLGY AND SOLUTION

5.1 The chemical Industry in the World

The chemical industry is one of the EU's most international, competitive and successful sectors, embracing a wide field of processing and manufacturing activities. In 2004, world chemicals sales were estimated at € 1776 billion. With 586 billion, **the EU 25 is the leading chemicals producing area in the world,** followed by Asia and USA. The EU 15 represents more than 95% of the EU 25's chemicals turnover. Taken together, the EU 25, Asia and USA represent about 85% of the world turnover. Germany is the largest chemicals producer in Europe, followed by France, Italy and the UK. Together, those four countries produce 61% of EU chemicals output (€ 586 billion). Adding Belgium, Spain Netherlands and Ireland raises the share to 88%. Poland is the biggest new EU country, representing 1.8% of total EU 25 chemicals sales, more than Denmark, Austria, Finland and Portugal. The EU chemical industry (excluding pharmaceuticals) comprises about 27 000 enterprises (data covering firms with no employees are excluded), 96% of which have less than 250 employees and may be considered as small and medium-sized enterprises. These account for 30% of sales and 37% of employment.

Only 4% of the EU enterprises (1080 enterprises) employ more than 249 employees and generate 70% of total chemicals sales. This is our first target, where we have the best chances to find SAP EHS running.

5.1.1 Total potential in the EU

Qualitative aspects: European market has some specific characteristics: multilingual (min 22 languages), multi alphabet (minimum 5), 2 time zones, a very high concentration of the chemical industry in a radius of 3 hours by car around Luxemburg, different political entities: EU countries, non EU Countries (I.E. Switzerland, Norway), federal states or not, centralized or not fire brigades, strong or weak link between private rescue teams and public rescue team, mixture of military (Paris, Marseille…), civil (Brussels, Antwerp…), professional (large cities) and volunteer (smaller cities) fire brigades. In addition a large part of the transport of goods is by truck riding together passengers' cars in extremely dense populated area.

Quantitative aspects: EU chemical industry represents roughly 30% of the World production of Chemicals. The area Antwerp-Rotterdam is the world largest concentration of chemical plants. The triangle area delimited by Rotterdam, Ludwigshafen and Lyon concentrates 66% of the European chemical production.

To determine the quantity of "potential clients" we will first define the number and the location of chemical companies within the EU.

Enterprises storing chemicals, and therefore developing a potentials risk may be classified in:

1. Enterprises producing chemicals
2. Enterprises trading chemicals
3. Hidden chemicals company (e.g. "Süd Zucker" producing Bio Ethanol, Arcelor with several Seveso Sites…)

5.1.1.1 Enterprises producing chemicals

27.000 companies in Europe, of which 1080 (4%) have more than 249 workers and represent 70% of revenue. Most of those 1080 companies have an ERP. However many of those organization are organized in many different companies (e.g. BASF Germany, BASF Belgium, BASF France…) and in different sites (e.g. BASF Belgium has 2 production sites, 1 headquarter and different remote sites). Therefore the potential of 1080 is reduced to no more than 100 potential clients.

Another way is to determine the market by the number of Seveso sites. A Seveso site is a site with a certain list of characteristics including the volume of chemicals stored and classified according EU directives. European Directive 96/82/EC on the control of major accident hazards involving dangerous substances. The legislation is more commonly known as the **Seveso II Directive**. This "Seveso II" Directive (96/82/EC) is aimed at the prevention of the major accident hazards involving dangerous substances, and the limitation of their consequences for man and the environment, with a view to ensuring high levels of protection throughout the Community. Seveso sites are classified inHigh Risks Seveso and Low Risks Seveso.

To get an idea the official inventory of "high risks" Seveso sites records 3.278 sites[27]. Here also most of large companies (e.g. Air Liquide: 82) have many Seveso sites and non-chemicals companies are also sometimes Seveso sites (e.g. Adisseo, producing food additives is classified as Seveso).

5.1.1.2 Enterprises trading chemicals

Risks are not limited to chemical producers but also to any organization storing dangerous chemicals. To give an idea of the range of dangerous chemicals products as different as Dioxin, Ethylic Alcohol (what you drink), fuel (to warm your house or displace your car), concentrate of soda drinks, airbag components, explosives, fuel for propellers, cleaning agents… are dangerous substances.

---

[27] http://europa.eu.int/comm/environment/seveso/pdf/report_fr.pdf

We have a detailed view of the commerce of chemicals thanks to the European Association of Chemical Distributors (FECC[28].)

The following table, extracted from a report of the FECC (31/12/2004) illustrates the concentration of organization trading chemicals (producers and/or production sites are not included) around Europe.

The number of members is large but the number of Seveso sites (9) in the CEE (EU at 15) and (176) in the EU at 25 illustrates that the market of ICE is relatively limited in our first target set of clients.

Chemical Trade & Distribution data as of 31/12/2004

Country	Belgium	Czech Republic	Denmark	Finland	France	Germany	Ireland	Italy	Netherlands	Portugal	Spain	Sweden	UK	Total FECC Nat. Ass.[1]	CEE [2]	Total EU 25 [1]
Total number of member companies	n/r	13	42	28	113	111	21	270	80	59	65	254	107	**1,193**		**1,193**
Number of Distributors Companies	15	13	42	28	71	92	21	240	60	59	65	30	88	**854**		**854**
Number of dedicated storage sites	n/r	43	35	18	79	145	10	140	30	70	67	37	192	**866**	**109**	**975**
Number of Seveso Sites	5	16	0	7	31	23	0	23	5	5	n/r	2	50	**167**	**9**	**176**

Figure 1: Key figures of the international chemical industry

n/r- Not Reported,

[2] Data reported by FECC Company Members on their activities in the following countries: Poland, Hungary, Latvia, Lithuania, Estonia, Slovakia, Slovenia, Cyprus and Malta

5.1.1.3 Hidden chemical companies.

By definition it's extremely difficult to identify those organizations. The food and pharmaceutical industry, the metal industry, the automotive industry, the public utilities (gas and electric plants) are candidates. It represents a potential of minimum 100 Seveso sites within the Amsterdam, Ludwigshaffen, Lyon triangle.

[28] FECC European Association of Chemical Distributors (http://www.fecc.org/) is the European voice of the chemical distribution and trading industry. Its membership includes both national associations and companies throughout Europe. FECC members create value in the supply chain by meeting the demands of over one million downstream users ranging over all branches of industry, with their specific needs and diverse purchase volum

5.1.2 Total potential in the in USA

Qualitative aspects: The US market is totally different of the European market: it is unilingual (however Spanish could become important in a short future), Three to four major areas can be identified: Mexican Gulf Coasts (Texas, Louisiana) South California (Los Angeles Area), Illinois and North Carolina to New Jersey. The USA has 4 time zones. The transport of goods uses largely railways and distance are long and crossing both populated and semi desert area. The regulation is simpler than in Europe, but some states (mainly California, New Jersey, Pennsylvania...) have more strict regulations. The fire brigades are composed either of professional (large cities) or of volunteer (smaller cities) with proportionally more volunteer crews than in Europe.

Quantitative aspects: The same 30 large companies are operating in the USA and in Europe. They use similar technology but BASF SAP HSE system is less installed than in Europe. As a strong contributor to the U.S. economy, the chemical industry provides over 2% of the total U.S. GDP and nearly 12% of the manufacturing GDP. On a value-added basis, chemicals are the largest U.S. manufacturing sector. The industry employed more than a million people in 1997, including nearly 90.000 scientists, engineers, and technicians engaged in R&D. After the EU, the United States is the largest chemical producer in the world (over 25% of total production). The chemical industry is one of the largest U.S. private sector investors in R&D, with chemical patents accounting for 15% of the total awarded in the United States. Pharmaceuticals research accounts for more than half of R&D spending. The chemical industry is a key development sector for the USA. They have published some statements concerning the strategic plan for the next 15 years and the second item is: *Capitalize on information technology by working with academic, federal and national laboratories, and software companies to ensure compatibility and to integrate computational tools used by the chemical industry. ("*Technology Vision 2020: The U.S. Chemical Industry*)*

5.1.2.1 Enterprises producing chemicals

California, Illinois, New Jersey, New York, Ohio, Pennsylvania, South Carolina, Tennessee, and Texas had about 50 percent of the establishments in the chemical industry in 2004. Illinois and Ohio with California concentrate the largest part of industry consuming chemicals and therefore are the places for hidden chemical industries.

5.1.2.2 Hidden chemical companies.

By definition it’s extremely difficult to identify those organizations. The food and pharmaceutical industry, the metal industry, the automotive industry, the public utilities (gas and electric plants) are candidates. The sector is large and there is no Seveso directive in the USA.

5.1.2.3 Other Information relative to the US market

At least two-thirds of the nation's fire departments are understaffed, according to the National Fire Protection Association (NFPA), which sets firefighting codes and standards. The shortage is worst in rural volunteer departments that have trouble recruiting new members. But many big and medium-size cities that are more likely to be terrorist targets are also short-handed. Some, including New York, have had to close fire stations; others, such as Houston, have had temporary closures. In many cities, response times are slower, and trucks go out with too few firefighters.

This information is positive for the market of ICE in the USA because, in general, a weakness in effective is replaced by technology and related to the statement about IT technology (see qualitative here above) it’s extremely positive.

5.1.3 Total potential in in China

Qualitative aspects: The problematic is similar but the culture is totally different. The large conglomerates developed after the establishment of the Communism in late forties compose a part of the production units and joint ventures with multinational enterprises represent a second part of the industrial environment in China. Of course some sites are a mix of both organizations and the development of a new entrepreneurship in China conducts to new sites some in highly populated area (coats, south east) or in other rural sites (provinces located to the west of Peking). The regulation, largely copied from European laws, is developing and the availability of a large number of cheap blue collars combined with the recent history of the economy: centralized planned economy, is not really ready to invest in extremely high IT technology for what may appear as problems of rich countries.

Quantitative aspects: The same 30 large companies are operating in China, in the USA and in Europe. We will assume they use similar technology but BASF SAP HSE system is less installed than in the USA and in Europe. BASF China uses SAP but the Chinese version of SAP HSE is currently in development.

We have no figures concerning the number of chemical companies.

5.1.4 Total potential in India

Qualitative aspects: India is in some aspects similar to China and close to Europe. The Bohpal accident in 1984 with more than 35000 casualties is in the memory of the authorities and is, wrongly, frequently cited as the first major chemical accidents of the world. Since the time of the incident, the chemical industry has worked to voluntarily develop and implement strict safety and environmental standards to help ensure that an incident of this type never occurs again. India has also developed regulations after but due to the economic growth, the political system, the culture it is extremely difficult to have an idea of the current application of those laws.

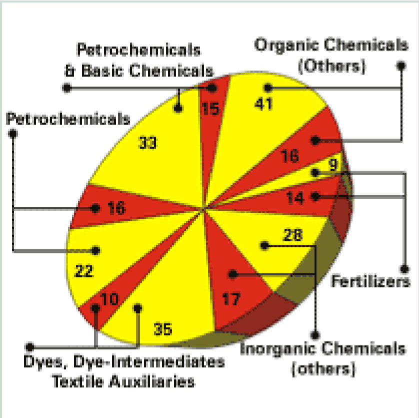
In other end India has developed a large expertise in IT technologies including SAP. Numerous IT services companies operate in India not only for local market but also for European and US markets: i.e.: the largest workforces of the IT division of Swissair were established in India in the late eighties. The Indian chemical products, like those from China, are exported all over the world. The quality is as good as the quality of products synthesized in Europe or the USA and the prices are seriously cheaper. The Quality Assurance (QA) systems of Indian companies, or, by the way, Vietnamese companies, are similar to the QA systems in our countries: ISO9000, GMP… We have, today, no more suitable information about the Indian regulations.

Quantitative aspects: Chemical Industry in India is concentrated in the Western part of the country, mainly in the states of Maharashtra and Gujarat. More than 60% of ICMA's[29] membership is represented from this region. It has also significant presence in the states of Tamilnadu and West Bengal. ICMA, being the apex body of the Chemical Industry, represents all sectors of the Indian Chemical Industry viz. Organic & Inorganic Chemicals, Plastics & Petrochemicals, Drugs & Pharmaceuticals, Fertilizers, Speciality Chemicals, Dyes & Dye-intermediates, Agrochemicals, etc.

The following sections describe the Indian situation:

[29] Indian Chemical Manufacturers Association

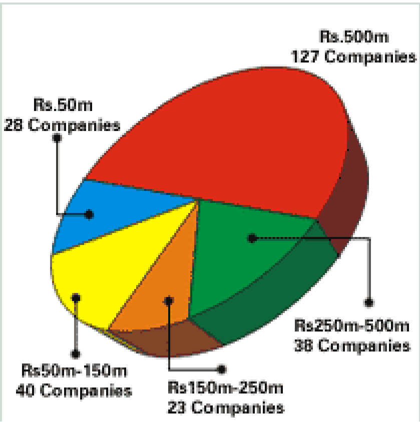
5.1.4.1 Industrywise break-up



- Petrochemicals & Basic Chemicals - 48 companies
- Organic Chemicals - 57 companies
- Petrochemicals - 38 companies
- Dyes, Dye-Intermediates Textile - 45 companies
- Inorganic Chemicals & Others - 45 companies
- Fertilizers - 23 companies

Figure 2 Indian chemical industry: Industry sectors

5.1.4.2 Classification of Members on the basis of turnover



- Rs.50 million - 28 companies
- Rs.50-150 million - 40 companies
- Rs.150-250 million - 23 companies
- Rs.250-500 million - 38 companies
- Rs.500 million - 127 companies

Figure 3 Indian chemical industry: Turnover

5.1.5 Total potential in a summary

Regions	Extra-EU Exports (Euro		Extra-EU Imports (Euro		Extra-EU Trade Balance (Euro billion)		
Chemicals excluding pharmaceuticals	Jan-Oct. 2005	Change against previous year	Jan-Oct. 2005	Change against previous year	Jan-Oct. 2005	Trade Contribution (Exports +Imports) %	Delta (against previous year)
Extra-EU 25	90.0	2.8%	59.0	8.7%	31.0	141.8	-2.2
NAFTA	24.5	0.4%	16.7	5.4%	7.8	28%	-0.8
USA	23.2	0.7%	16.0	4.7%	7.2	27%	-0.6
Asia	19.8	8.8%	15.6	20.4%	4.2	22%	-1.1
Japan	5.0	0.4%	4.7	2.4%	0.3	7%	-0.1
China	3.4	18.6%	4.2	32.6%	-0.8	4%	-0.5
Latin America	6.1	4.4%	2.4	19.1%	3.7	6%	-0.1
Africa	5.5	10.9%	1.6	6.7%	3.8	5%	0.4

Data Source: Eurostat (Comext)

Figure 4: Key figures of the international chemical market

The here above table describes the role of the different economical areas and the emerging part of China, Asia (mainly India) and Latin America (mainly Brazil).

5.2 Efforts required

5.2.1 Efforts for development

Before the commercialization ICE has to be transformed into a product. This product may either be used by industry or by the public authorities. In both cases the proposed information has to be available in the local language (English, German…) but considering also the local cultural specifics:

- Private fire brigades highly trained for the products processed in a specific plant,
- Local public fire brigades trained for any product processed by any storage or process unit of the area,
- Civil protection units trained to any chemical,
- Police forces,
- Emergency medical services,
- Ambulance,
- Authorities,
- …

The information proposed has to be either emergency information and the Ericards are an excellent base but also volumes stored and localisation of the products. SAP based systems have the first information and the Safir team contains several GIS specialists able to handle and integrate the second information.

The current developments and prototyping are limited in languages (up to four), target customers (SAP EHS clients) mainly private fire brigades and functionalities (only ERICard like information).

5.2.2 Efforts for for distribution

To distribute ICE the approach will be totally different according to the target users. The current analysis is limited and relatively theoretical.

The members of the WP are, currently, in contact with several potential clients on a networking base only:

- **BASF IT Services**
  - With BASF and the SAP EHS users worldwide
  - With German industrial fire brigades and some public brigades

- **JPASS International**
  - With public fire brigades (first demo end of April 2006)
  - With both large and smaller chemical companies, and with international emergency teams (through ESA and Areva)

An organisation like Cefic would also play a part of the game as Cefic has made for ADR, ICE, Ericards and other topics. Cefic will be informed about this project mid April 2006.

Therefore, currently, we have segmented the market in 2 large segments. A more detail segmentation is in progress.

5.2.2.1 Large SAP EHS Clients

The distribution and the sales effort are limited because the different key people are identified. However the different partners able to set up an SAP EHS system are various and compete together; therefore the effort to distribute a product (ICE) mainly developed by one consulting company (BASF IT Services) to clients of other consulting organizations: DOW Corning consultants, Technidata, Accenture, HP consulting, IBM consulting... has to be seriously evaluated and could be extremely large, mainly in term of time.

5.2.2.2 Non Large SAP EHS Clients

For those potential clients, from both the industrial and public sector, the distribution effort would be smaller if, for example, a suitable structure is installed: a, relatively, small international organization collecting information from any chemical company, experienced with such a system, financed by the owner ofthe information in one end and by the user of the information in other end, structuring the information and, after a while, interfaced with the system of the clients described in 5.2.2.1. Similar structures existing today derive from both, the private sector: CMT/Quicksds (France), Chemwatch (Australia), SGS (Swiss)... as well as the private and public sector together; NCEC (UK), Belintra (Benelux), ICE (EU)...

Those clients would “buy” the service to an operator with different potential variations, i.e.: the chemical manufacturers would have to pay to deliver, store and update the information to an ICE centre and the fire brigades would have a free access to one ICE centre, or the access would be free for fire brigade paying a periodic fee to get informed, or…

However, the current habit in the sector is that the chemical producers or importers pay to publish information: MSDS, Tremcards, ERIcards, … and that the user of the information (clients, anti poison centres, authorities, and, of course, competitors…) gets that information for free. Therefore a system delivering information relative to volumes stored, place stored has to be strictly limited to people who need to know it (fire brigades in a limited typical situation) to keep the confidential information confidential.

5.2.3 Volumes and Pricing

About the amount of information stored and, consequently, the pricing to apply some figures are necessary before to go further:

- The MSDS is the second largest commercial document distributed on the world after the invoice (according to Chemmate Inc. Canada)
- In EU the current number of MSDS is larger than 4.000.000 (one MSDS per language).
- In USA the number of documents relative to the transportation of chemicals is larger than 3.000.000 a year.(US Department of Transport)

Those volumes are large enough to consider a pricing not in a range of a yearly fee of 1 up to 10 euros per product for the service. Set-up fees, connection fees and other additional fees could be necessary. However the price should not be an obstacle to the development of the services.

ANNEXE A

6. BACKGROUND FIGURES TO THE MARKET POTENTIAL

German chemical industry indicators

	1995	2000	2004	2005*
Total sales (in billion euros)	112.3	135.0	142.1	148,5
Output (change against previous year in %)	..	+4.1	+2,5	+2 bis 2,5
Employment (staff in 1,000)	536	470	445	443
Exports (in billion euros)	51.8	76.6	99.4*	106,4
Imports (in billion euros)	32.3	52.7	66.8*	70,8
Fixed asset investments in Germany (in billion euros)	5.8	6.8	5.9*	-
R&D expenditure (in billion euros)	5.3	7.1	7,7	-

* VCI-Forecast/Estimate
Sources: Destatis, VCI

Figure 5: Key figures of the German chemical industry[30]

[30] Source: VCI (http://www.vci.de/template_downloads/tmp_0/Branche_EN05.pdf?DokNr=66209&p=101)

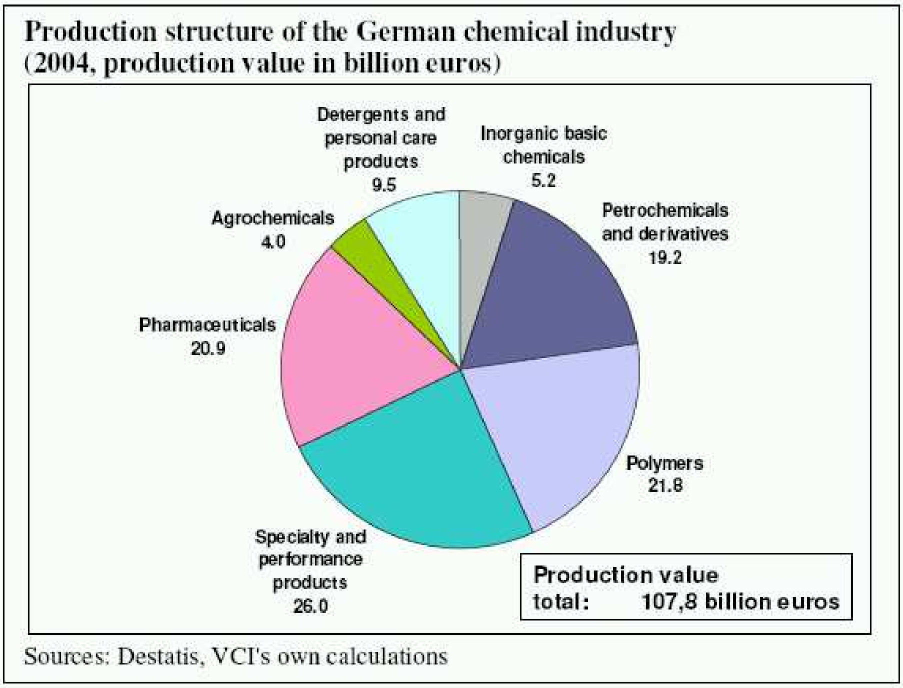


Figure 6: Product range of the German chemical industry

The TOP 10 among German chemical companies in 2004

Rank	Company	Global sales (bn €)	Global employees
1	BASF AG	37.537	81.955
2	Bayer AG	29.758	113.300
3	Degussa AG	11.244	44.566
4	Henkel KGaA	10.592	51.200
5	Boehringer Ingelheim GmbH	8.157	35.529
6	Fresenius AG	7.271	68.474
7	Lanxess AG	6.773	19.700
8	Merck KGaA	5.859	28.877
9	Schering AG	4.907	26.131
10	Beiersdorf AG	4.546	16.492

Source: VCI

Figure 7: Biggest chemical companies in Germany

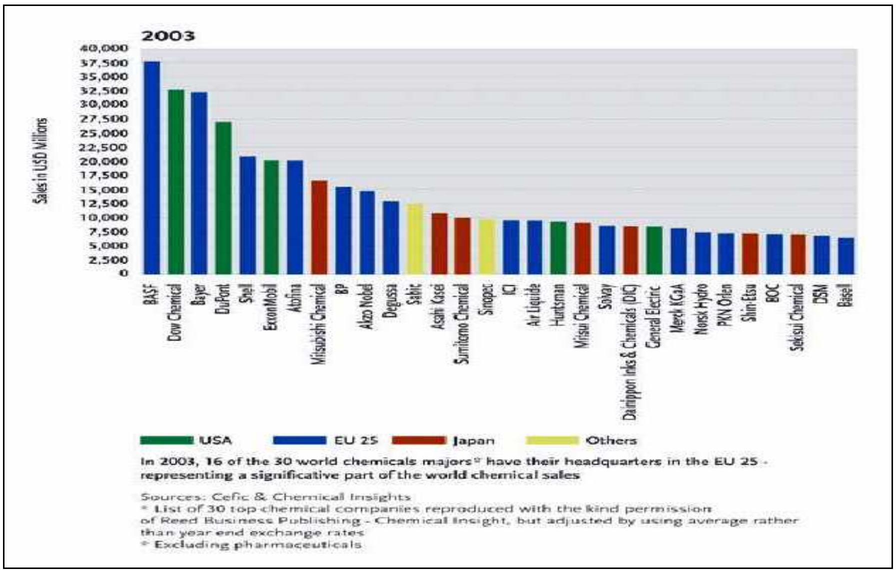


Figure 8: World's biggest chemical companies31

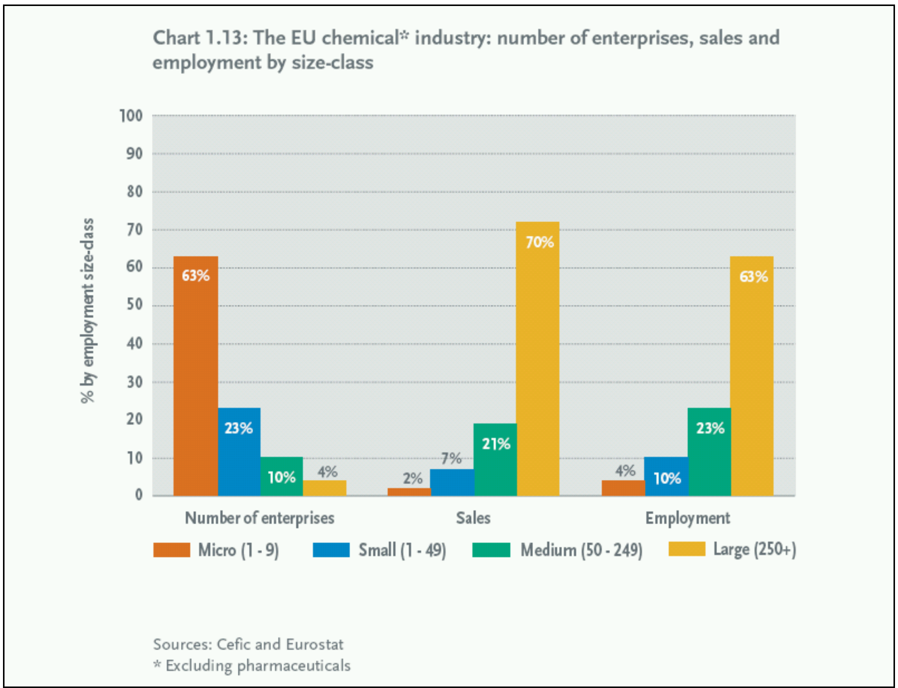


Figure 9: Number of chemical companies in the EU by size-class[32]

[31] Source: CEFIC (http://www.cefic.org/factsandfigures/downloads/allgraphs/F&FJuly2005.pdf)
[32] Source: CEFIC (http://www.cefic.org/factsandfigures/downloads/chart1.13.pdf)

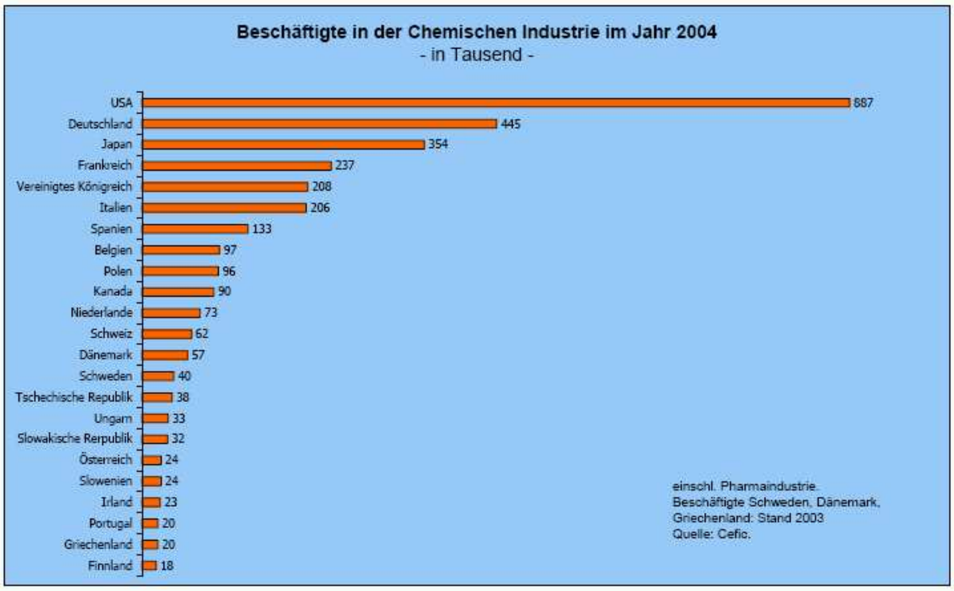


Figure 10: Number of employees the in chemical industry[33]

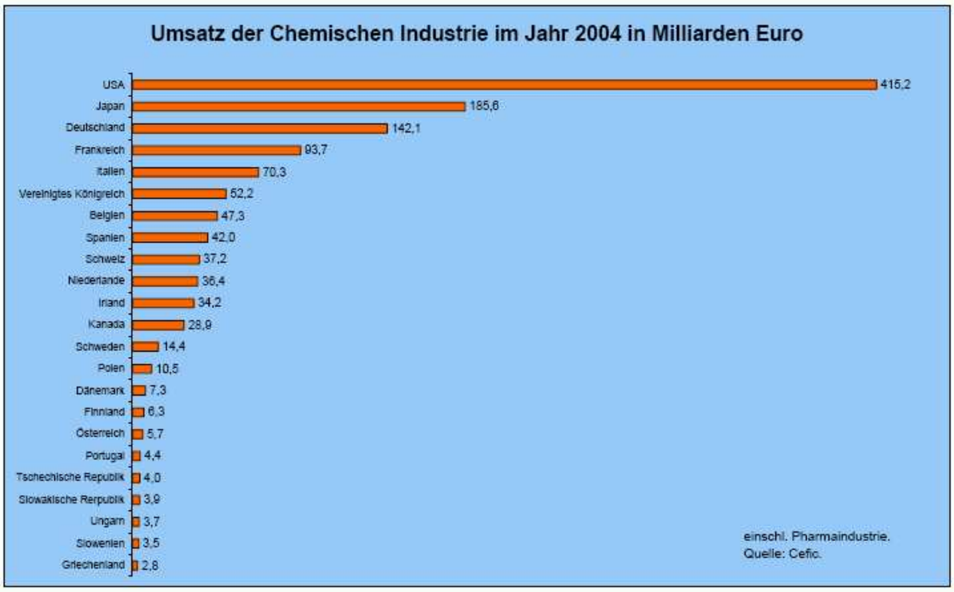


Figure 11: Gross revenues of the chemical industry per country

[33] Source:Institut der Deutschen Wirtschaft, Köln (http://www.bavc.de/internet/bavc/bavc_public.nsf/0/41256CC000445A0541256FEB003E3AC5/$file/IW-Studie-Chemie-BAVC-Endfassung.pdf)