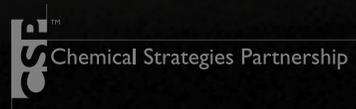


Chemical Management Services

Industry Report 2004

CREATING VALUE THROUGH SERVICE



CMSFORUM
a program of the Chemical Strategies Partnership

Chemical Management Services

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Executive Summary

In 2000, the first-ever report on the state of the newly emerging chemical management services industry was released. At the time, the “chemical management services” (CMS) market had not been distinguished separately from traditional chemical product markets. There appeared to be sufficient growth in the CMS market to warrant a deeper look at this new emerging niche in the chemical industry. Thus, the non-profit organization, Chemical Strategies Partnership, published the *Chemical Management Services Industry Report 2000*. The report provided an overview of the CMS industry’s structure, conduct, and performance.

This report, *Chemical Management Services Industry Report 2004* is an update to the original report and looks at trends and performance since 2000. It is based on responses to a detailed survey by thirteen CMS providers and ten major CMS customers, follow-up interviews, market research, and CSP’s direct experience in the field.

The Market

The CMS market has grown roughly 50% from 2000 to approximately \$1.22 billion (FY1999-2003) and all indicators point to continued steady growth. CMS is consistent with other larger business trends including outsourcing and shifting to service-based business models to realize greater profitability. We estimate the potential U.S. CMS market to be \$17-19.5 billion.

The most notable change in the CMS market from 2000 is the growth in the number of industrial sectors using CMS. CMS is now utilized in eleven sectors with penetration in several sectors above 30% (see Table 1). The automotive industry still leads in the adoption of CMS with about 75-80% of the industry utilizing CMS. However, there has been significant growth in the use of CMS in air transport maintenance (40-50% penetration) and aerospace manufacturing (25-30% penetration).

Table 1. Industry sectors utilizing CMS

<ul style="list-style-type: none"> • Automotive manufacturing (OEM) • Automotive suppliers • Heavy equipment • Aerospace manufacturing • Air transport maintenance • Miscellaneous manufacturing & others 	<ul style="list-style-type: none"> • Electronics • Energy/Utilities • Steel Manufacturing • Food/Beverage • Research/Laboratory
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The CMS market has grown roughly 50% from 2000 to approximately \$1.22 billion (FY1999-2003).

CMS is now utilized in eleven sectors with penetration in several sectors above 30%.

Survey respondents reported net savings of 5%-20% in the first year of implementation.

Industry Structure

The CMS market is served by two distinct provider groups. Approximately 75% of the providers interviewed are considered “product-based” providers. These tend to be large chemical producers who target customers who use (or could use) their products. Over the past ten years, providers have followed their product into the customers’ facilities. Traditionally, these providers have served one of three sectors: automotive, metalworking, or semiconductor. However, we are seeing aggressive activity in new sectors from the product-based providers. In the 2000 survey, CMS providers generally reported that they focused on serving one or two industries. However in 2004, more than half of the providers surveyed serve four or more industries. The aggressive move into new markets may indicate more service expertise being developed among the provider base and thus more success in selling into new markets.

The remaining 25% of CMS providers are service-based, meaning they do not produce chemicals themselves. Instead, they rely on sophisticated service models to target customers with more highly diversified and specialized chemical purchase profiles. They are often more capable of serving industries that are characterized by a higher diversity and lower volume profile of chemical use. Typically, this includes customers in the aerospace, airline maintenance, and electronics industries (excluding semiconductor).

With the growing popularity of CMS and customers who are more educated about the CMS model, there appears to be more of an opportunity for new CMS providers to enter the market now than in 2000. Most notable is activity and interest among environmental and MSDS (Material Safety Data Sheets) information management companies to form alliances with CMS providers to serve new markets characterized by low volume, highly diverse chemical product mix.

Delivering Value to Customers

Customers continue to enjoy significant cost savings and emissions reductions through the implementation of CMS. Survey respondents reported net savings of 5%-20% in the first year of implementation. Over the first three years of the contract, a majority of providers estimate they deliver 6-10% savings per year or more. The majority of savings come from reducing the amount of chemical used, reducing the price of the chemical product, and improving manufacturing processes. Customers are enjoying not only significant cost savings, but also significant environmental benefits from reduced chemical volume, reduced emissions, reduced risk, and better data for reporting.

Many of the CMS contracts cover the entire chemical lifecycle as well as most of the customer’s chemical “footprint” and involve significant investments in on-site staff. Contracts are often modified over their typical lifespan of three to five years to increase the scope of services and the range of products. They are also rather sophisticated, typically including two or three compensation mechanisms – most often a combination of chemical purchase cost pass-through, management fees, and mandated and/or shared cost savings.

CMS Industry Revenue, Profitability and Growth

The growth in the CMS market has translated into strong financial performance for providers and continues to outperform profitability for the chemical industry as a whole. All of the respondents reported revenue growth over the past three years. Approximately 50% of the respondents cited growth greater than 10% per year over the past two years. Based on future projections by CMS providers, we expect future revenue growth to meet or exceed that of the past several years.

Only a few of the providers surveyed divulged information regarding their profit margins. For these respondents, profit margins ranged from 5-25% in 2003. Growth in profit margins since 2000 has been steady at about 5-10% per year and is projected to remain at 5-10% per year through 2006.

The expectations for growth for the CMS industry are in contrast to the traditional chemical industry. Although chemical sales in 2003 for the top 50 companies worldwide increased 15% from the previous year, profit margins fell by 5.5%. The positive profitability growth of CMS is a bright light in the chemical industry where profit margins have dropped steadily since 1997. In addition, since the chemical industry is cyclical in nature, chemical management services can offer steady growth and an opportunity to build stronger relationships with customers.

Outlook

Remarkably, providers reported that their profits are derived primarily from the services sold and savings achieved. This is in contrast to responses in 2000 that placed commodity sales as one of the top profit drivers. The value providers are delivering in services is likely a driver in the expansion of CMS into new industry sectors and providers' enthusiasm to continue pursuing new markets. 62% of providers expect the most growth in CMS opportunities to be with new customers. This is quite different than the outlook in 2000, where 20% of providers felt that growth opportunities were with new customers.

In 2000, a top priority for investment was information management capability and a majority of the providers followed through on these investments. Therefore, in 2004 we see more diversity in expected investments that reflect positioning for a rapidly growing market. Just over 50% indicated that they will invest in information technology, while investments in training, new market segments, and improved chemical and process technologies rated high.

Growth in profit margins since 2000 has been steady at about 5-10% per year and is projected to remain at 5-10% per year through 2006.

62% of providers expect the most growth in CMS opportunities to be with new customers.

Challenges and Recommendations

The CMS industry continues to be dynamic, nimble to meet customers' needs, and expanding steadily. Several key areas pose challenges to that growth, but the industry is well positioned to address them in the next several years.

- *International Expansion.* There is significant growth potential for CMS internationally. However, CMS providers are reporting difficulties in expanding the CMS business model into international markets due to informational, cultural, and financial barriers. Therefore, it is no surprise that 75% of providers see the greatest growth potential for CMS in the United States. CMS providers need to develop the right cultural approach to sell CMS in different international markets, but also the logistical infrastructure in those areas to support CMS activity. Governments in Asia and Europe are investing in learning about and promoting the CMS model which offers a window of opportunity for CMS providers.
- *Technological Innovation.* One particular challenge for the future efficacy of CMS is the ability of providers to continuously bring value to their customers and to introduce new technologies, new chemistries, and process efficiency improvements for their customers. CMS providers need to continue tapping a number of resources both internally and externally to serve this need.
- *CMS in Smaller Facilities.* CMS is implemented most often in large industrial facilities, but the potential market for smaller sites is significant. Currently, it is difficult to cost-effectively implement a CMS program at a facility that purchases less than \$1 million in chemicals annually. For continued growth of CMS, strategies for serving the small and medium-sized markets need to be developed.
- *Industry Promotion and Data.* The most compelling information for successfully promoting CMS is good case study data and industry market data. The industry should continue its joint educational efforts through the CMS Forum, continue to aggressively build its membership, and support more industry research activities and case study development.

Introduction

In 2000, the first-ever report on the state of the newly emerging chemical management services industry was released. At the time, the “chemical management services” (CMS) market had not been distinguished separately from traditional chemical product markets. There appeared to be sufficient growth in the CMS market to warrant a deeper look at this new emerging niche in the chemical industry. Therefore, Chemical Strategies Partnership, a non-profit organization, produced *Chemical Management Services Industry Report 2000* based on market research and response by fifteen CMS providers and fifteen major CMS customers to a detailed survey. The report provided an overview of the CMS industry’s structure, conduct, and performance. This report, *Chemical Management Services Industry Report 2004* is an update to the original report and looks at trends and performance since 2000.

What is CMS?

The chemical industry is beginning to take cues from other product-based industries and transform its profit model towards service. Chemical suppliers are becoming chemical service providers, where they are rewarded for improving chemical management and environmental performance for their customers, not for selling more chemicals. These providers are part of a national trend in business strategy to identify service and function—and not product itself—as the basis of profit and value creation.¹ Customers often want service more than they want products. They want affordable, reliable transport (not necessarily vehicles), comfort and power (not gas and electricity), information access (not computers), and clean machine parts (not solvents). CMS is also consistent with a trend where profitability growth for product-based companies is in revenues from service, not from the product.²

Under this new chemical service model, manufacturers shift away from a traditional supplier relationship to a strategic alliance with a “chemical service provider”. Instead of purchasing chemicals, the manufacturer purchases chemical management services (CMS): assistance in purchasing, managing, and tracking of chemicals. This shift to chemical services often aligns the incentives of the service provider and chemical user to reduce chemical use and costs by tying the compensation of the chemical service provider to services, not to the volume of chemicals sold. Chemical service providers are rewarded for reducing costs and optimizing chemical use. Chemical management begins with procurement and extends through use and disposal of chemicals. These activities make up the chemical lifecycle within a company.

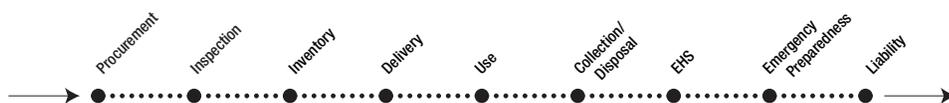
¹ This service-based business strategy appears in both incipient and mature forms across a broad array of traditionally product-based firms: XEROX from a photocopy machine maker to the “Document Company”; IBM from a mainframe and PC maker to a solutions and information services company; Herman Miller from an office furniture maker to an office furnishings service provider (etc.)

² In 1999, IBM’s Global Services division accounted for 37% of IBM’s sales, but 45% of the company’s profits. Competitors to IBM, including Dell, Hewlett-Packard, and Sun Microsystems are all aggressively building their own service divisions as well. (David Rocks, “IBM’s Hottest Product Isn’t a Product,” *Business Week*, October 2, 2000)

Optimizing chemical management activities and reducing these lifecycle costs are the basis for the value proposition of CMS.

At each stage of the lifecycle, a company incurs quantifiable costs of equipment, materials, labor, liability, safety training, and compliance efforts (see Figure 1). Several studies have revealed these lifecycle costs can range from one to ten times the purchase cost of chemicals. Optimizing chemical management activities and reducing these lifecycle costs are the basis for the value proposition of CMS.³

Figure 1. Chemical Lifecycle



For the purposes of this report, we define CMS as a strategic, long-term relationship in which a customer contracts with a service provider to supply and manage the customer's chemicals and related services. Under a CMS contract, the provider's compensation is tied primarily to quantity and quality of services delivered, not chemical volume. CMS goes beyond invoicing and delivering product to optimizing processes, continuously reducing chemical lifecycle costs and risk, and reducing environmental impact.⁴

Report Authors

Recognizing the joint business and environmental potential of CMS, the Chemical Strategies Partnership (CSP) was formed to test CMS as a business model to reduce chemical use and integrate environmental considerations into strategic business decision-making processes.⁵ CSP was launched in 1996 with funding from the Pew Charitable Trusts, and subsequently the Heinz Endowments. CSP seeks to promote CMS as an innovative, cost-effective means of achieving chemical use reduction. Over the past eight years, CSP has been directly involved in the conception, negotiation, and documentation of numerous CMS agreements, and has served as an information clearinghouse between providers and customers. In 2000, the CMS Forum was established as the membership arm of CSP. The CMS Forum is a coalition of CMS providers, their customers, Tier II chemical suppliers and other stakeholders.

Objectives of the Report

This industry report provides CSP's overview of the CMS industry's structure, conduct, and performance. It is the second national assessment of the CMS industry. The 2004 report is based on survey responses by CMS customers and providers to a detailed survey. It is supplemented by CSP's direct experience in the field and market research. The report is intended to provide interested stakeholders with a candid and independent evaluation of the state of the CMS industry.

Methodology

In total, thirteen CMS Providers and ten CMS customers were surveyed for this report. Surveys were completed confidentially by executives and managers of CMS provider companies (those that provide chemical management services)

³ *Tools for Optimizing Chemical Management—CSP Manual*, Chemical Strategies Partnership, 1999, p. i.ii.

⁴ This definition was developed by a group of 14 leading CMS providers in 1999 (www.cmsforum.org).

⁵ The Chemical Strategies Partnership is a project of the Trust for Conservation Innovation, a 501(c)3 organization.

and CMS customer firms (those that have engaged a CMS provider to manage some or all aspects of chemical procurement, use and disposal). Follow up interviews were conducted with the survey respondents by University of California graduate students and CSP staff to gather additional CMS provider and customer qualitative data. Survey results were consolidated into Survey Monkey™, an online tool for survey distribution and analysis. (See Appendix A for sample surveys.)

We estimate the CMS providers surveyed represent approximately 85% of CMS “Tier I” activity globally. (See below for definitions of Tier I and Tier II providers.) Although CMS is implemented globally, the data in this report focuses primarily on U.S. activity. There was insufficient data to assess the nature of international activity and ultimately, the majority of CMS activity is still taking place in the United States. Nevertheless, this report does address international trends, opportunities, and barriers.

Based on the survey responses, CMS providers interviewed are active in the following eleven sectors:

- Automotive manufacturing (OEM)
- Automotive suppliers
- Heavy equipment
- Aerospace manufacturing
- Air transport maintenance
- Miscellaneous manufacturing & others
- Electronics
- Energy/Utilities
- Steel Manufacturing
- Food/Beverage
- Research/Laboratory

The majority of customer companies interviewed are classified as multi-facility (80%), international (60%) companies with seven of the ten customers classified as Fortune 500 companies. There was little variation in the size of the companies—more than 80% have greater than 10,000 employees and 90% record sales revenues of more than \$2 billion annually.

Participants in the Survey	
Customers	CMS Providers
The Boeing Company	Avchem, Inc.
Continental Airlines Inc.	L’Air Liquide SA
DaimlerChrysler AG	Air Products and Chemicals, Inc.
Dana Corporation	Castrol Industrial North America, Inc.
Delta Air Lines, Inc.	Chemico Systems, Inc.
Eaton Corporation	Dow Corning Corporation
General Motors Corporation	Haas TCM
Seagate Technology LLC	Henkel Chemical Management
Stanford Linear Accelerator Center	Houghton International Inc.
United Technologies Corporation	Interface LLC
	PPG Industries, Inc.
	Quaker Chemical Corporation
	Shell Services USA

Industry Structure

Characterizing the CMS Provider Industry

The thirteen CMS providers interviewed represent a range of organizational types. The CMS companies surveyed characterized themselves as chemical manufacturers, engineering/consulting firms, distributors, service providers, and waste vendors. CMS programs create value for their customers by streamlining the chemical supply chain. A customer will still receive products, and sometimes services, from more than one supplier, but will consolidate functions under a single “Tier I” CMS provider. “A Tier I CMS provider engages in a strategic, long-term relationship with a customer to supply chemicals and to manage related services. This Tier I provider will manage and interact with numerous “Tier II” suppliers on behalf of the customer. For the thirteen CMS providers surveyed, all but one are considered Tier I CMS providers, and five (38%) of those also have accounts where they are Tier II CMS providers. Thus, as the market expands and matures, we are seeing collaboration among CMS providers to meet more complex and more comprehensive customer needs.

In 2000, about 70% of the providers interviewed were identified as “mature” providers and the remaining as “emerging” providers. Four years later, the breakdown is largely the same, but there is a more clear distinction between those who identify themselves as “product-based” and “service-based” providers. Approximately 75% of providers interviewed are generally large chemical manufacturers with CMS divisions (product-based providers); the remaining 25% do not manufacture chemicals and take a strictly service approach to providing CMS (service-based providers).

75% of the CMS providers surveyed are chemical manufacturers who have a separate CMS division.

Product-based companies. 75% of the CMS providers surveyed are chemical manufacturers who have a separate CMS division. 54% percent of these companies have more than 10,000 employees and more than \$1 billion in annual sales. However, their CMS activity comprises only one division of the company: 62% percent of these divisions have more than 100 employees.

Product-based CMS providers generally target customers who use (or could use) their products. There is a debate among customers as to whether chemical manufacturers make the best service providers. Some customers feel that their CMS provider must have expertise in the chemicals that they are providing in order to bring value. Of the customers surveyed, 67% felt that the provider’s product expertise was one of the most important factors in selecting the CMS provider. Others feel that chemical manufacturers are compromised as a CMS provider, because they have a bias towards placing their own product on the plant floor even if a competitor’s product is cheaper or more appropriate.

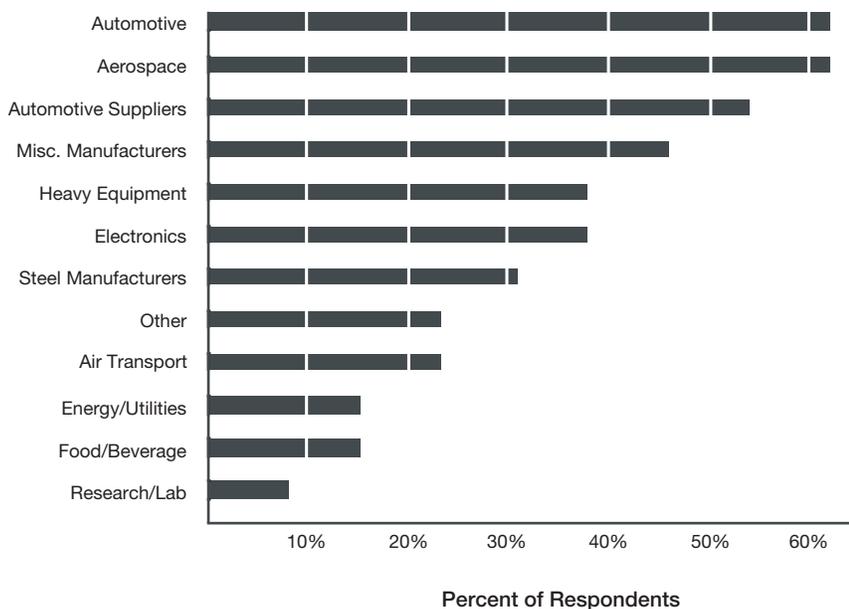
Service-based companies. 25% of the CMS providers surveyed do not manufacture chemicals and take a strictly service approach to providing CMS. They are smaller in size relative to the chemical manufacturers: two-thirds of these service-based companies have CMS sales of under \$50 million. They are often more capable of serving industries that are characterized by a lower volume, higher diversity chemical profile where one primary chemical supplier does not dominate their chemical use. For a non-manufacturer of chemicals, this creates an environment that is conducive to providing value. The value is provided in services such as reliable and coordinated chemical management logistics, better information management, and a focus on improving process efficiency to optimize chemical use.

CMS is Expanding to a Wide Range of Sectors

In 2000, CMS providers reported CMS activity in five industries: automotive, metalworking, aerospace manufacturing, air transport, and electronics. Although CMS is still widely used and growing in those five sectors, CMS providers are now expanding into sectors that were previously underserved. These sectors include steel, energy/utilities, food and beverage, and research laboratories. CMS providers are now active in over eleven sectors (See Figure 2.)

CMS providers are now active in over eleven sectors.

Figure 2. Markets where CMS Providers are Currently Operating (provider response).



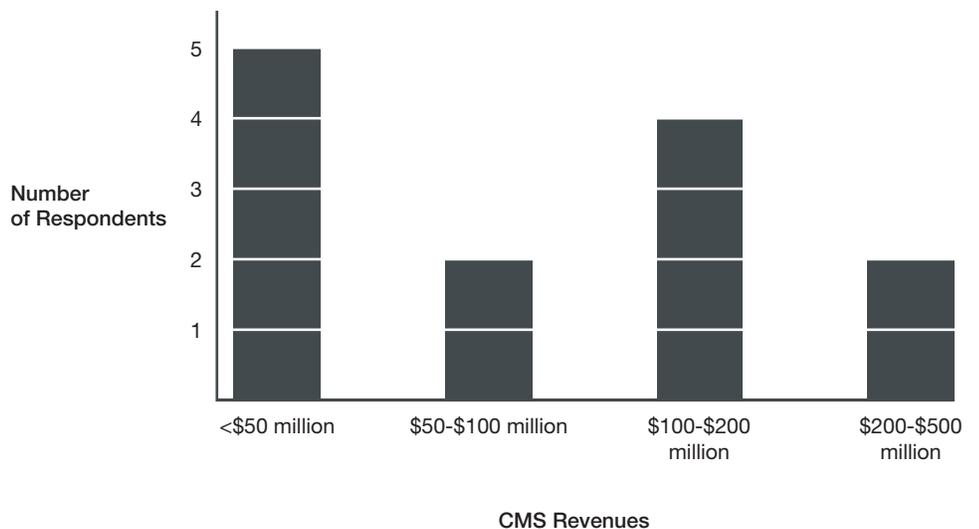
Market Overview

In 2003, the CMS providers surveyed were active in eleven sectors representing \$1.22 billion in revenue.

Overall Market Size

CMS providers surveyed in the 2000 CMS Industry Report represented about \$800 million in CMS revenue (1999 data) and were active in five sectors: automotive, metalworking, aerospace manufacturing, air transport maintenance, and electronics. (Revenue includes CMS provider management fees as well as the amount of chemicals sold.)⁶ In 2003, the CMS providers surveyed were active in eleven sectors representing \$1.22 billion in revenue.⁷ Thus, growth in the CMS market is estimated to be about 50% over the past four years.

Figure 3. Annual Total CMS Division Sales Revenues for CMS Providers (2003)



In the 2000 report, CSP estimated the potential CMS market for eight industrial sectors was approximately \$10.5 to 13 billion.⁸ Since 2000, others have estimated the market size using different methodologies but have arrived at generally the same figures. In updating CSP's estimate of the market size, we took one of the alternative proven approaches, since the original data sources were difficult to access. We looked at the US specialty chemical market, and made a series of assumptions to arrive at the potential market size for CMS.

In 2003, the US specialty chemical market was \$115 billion.⁹ Approximately half of those chemicals are not amenable to CMS, such as bulk medicinal chemicals, pesticides, specialty polymers, flavors and fragrances, and specialty ceramics.¹⁰ In addition, approximately two-thirds of all specialty chemicals are purchased in small quantities (less than 1 million in annual chemical buy per site) which often

⁶ This revenue reflects the CMS activity of approximately 85% of CMS providers. Chemical Strategies Partnership, 2000 CMS Industry Report, p.11.

⁷ Revenue estimate was derived from responses to the CMS provider surveys. This revenue reflects the CMS activity of approximately 85% of CMS providers. Some revenue figures were specific and some were derived from responses identifying a range of revenue.

⁸ Chemical Strategies Partnership, 2000 CMS Industry Report, p.11.

can not support the cost of a CMS program as it is typically implemented. Thus, we estimate a potential market size of chemicals sold that could be included in a CMS program to be \$17 billion.

According to CMS providers surveyed, many compensation arrangements involve a management fee in addition to the amount of chemicals sold. The management fees often amount to between 10-15% of the chemical spend. If we add the additional revenue to the \$17 billion in chemical spend, we adjust the market size up to \$19.5 billion. (See Appendix C for a full discussion on market size methodology.)

CMS providers surveyed represent about \$1.22 billion in CMS revenue or approximately 6-7% of the potential \$17-19.5 billion U.S. market.

Market Penetration

The most notable change in the CMS market from 2000 is the growth in the number of industrial sectors using CMS. CMS is now utilized in eleven sectors with penetration in several sectors above 30%. Table 1 describes the estimated adoption of chemical management services by seven industries. We did not receive sufficient information for the remaining four industries to make an estimate. Since 2000, the greatest growth sectors have been in aerospace and air transport maintenance.

The potential U.S. CMS market is estimated to be \$17-19.5 billion.

Table 1: Providers' estimates of CMS penetration in key sectors

Sector	Provider Estimates of CMS Penetration 2004	Provider Estimates of CMS Penetration 2000
Automotive	75-80%	50-80%
Automotive Suppliers	30-40%	Included in automotive estimate
Heavy Equipment	15-25%	15-25% (formerly metalworking)
Aerospace Manufacturing	25-30%	5-15%
Air Transport Maintenance	40-50%	10-20%
Electronics	30-40%	30-40%
Steel Manufacturers	20-30%	---
Energy/Utilities	Under 10%	---
Misc. Manufacturing	Under 10%	---
Food/Beverage	Under 10%	---
Research/Laboratory	Under 10%	---

9 *Chemical Week*, January 7/14, 2004, p.19. *Chemical Week* specialty chemical market includes: coatings, fine chemicals, adhesives and sealants, plastic compounds, I&I cleaners, food additives, plastic additives, flavors and fragrances, water treatment chemicals, catalysts, oilfield chemicals, lube additives, cosmetic additives, paper additives, rubber chemicals, and others.

10 Bierma, Thomas J; Waterstraat, Frank L. "Chemical Management: Overcoming Barriers to Diffusion", Champaign, IL: Illinois Waste Management and Research Center, Appendix 1, 2001.

Diversification of Customer Base

In the 2000 survey, CMS providers generally reported that they focused on serving one or two industries. However in 2004, more than half of the providers surveyed serve four or more different industries.

As cited earlier, the number of sectors using CMS has also more than doubled. This sharp change in the diversity of sectors utilizing CMS bodes well for future growth. Looking at the penetration rates from 2000 to 2004 for the aerospace and air transport industries (which were relatively new sectors in 2000), we see that adoption can happen rather quickly within a sector once a few leading customer companies initiate a CMS program.

Industry continues to be highly dynamic

The CMS industry has experienced acquisition and divestiture activity over the past two years. Some of the most notable activity is outlined in Table 2.

Table 2. Industry Merger, Acquisition and Divestiture Activity*

Great Western International filed for bankruptcy in mid-2001.¹¹

Haas Corporation acquired the total chemical management business of Radian International to form HaasTCM, October 2002.¹²

Air Products purchased Ashland Specialty Chemical Electronic Chemicals division, June 30, 2003.¹³

Nalco sold to a private equity group in 2003.¹⁴

Onyx Environmental Services LLC and Rinchem Co. Inc. formed an alliance in May 2004 to evaluate and develop chemical waste and chemical projects nation-wide.¹⁵

SciQuest is acquired by Trinity Ventures and becomes a private company, June 2004. It was publicly listed on the NASDAQ.¹⁶

* Note: This list may not be comprehensive.

Diminishing Barriers to Entry

With the growing popularity of CMS and customers in a variety of sectors more educated about the CMS model, there appears to be more of an opportunity for

With the growing popularity of CMS and customers in a variety of sectors more educated about the CMS model, there appears to be more of an opportunity for new CMS providers to enter the market than in 2000.

11 Shelly Strom, "Great Western Says it was Felled by Y2K", *Portland Business Journal*, July 20, 2001.

<http://portland.bizjournals.com/portland/stories/2001/07/23/story1.html>

12 <http://www.haastcm.com/news/PressRelease.asp?id=32>

13 "Financing Chemicals," *Chemical Week*, March 10, 2004: p. 18.

14 "Financing Chemicals," *Chemical Week*, March 10, 2004. p. 18

15 <http://www.rinchem.com/Rinchem%20Press%20Release%20FINAL.pdf>

16 *Purchasing*, June 3, 2004, p.10

new CMS providers to enter the market than in 2000. Four years ago, there was relatively deep penetration of a highly consolidated customer base in the auto and metalworking sector and a provider base primarily comprised of large chemical manufacturers. Thus, few clear opportunities existed for a new entrant. However, now with CMS activity in more than ten sectors there is opportunity for new entrants to gain market share if they have existing relationships with untapped customers in those sectors.

Since 2000, there have been two notable new entrants. Chemico Systems is a product-based company serving the automotive industry, and Avchem is a service-based company primarily serving the aerospace industry. Both began in collaboration with a customer base that was committed to the success of the CMS provider and worked with them to grow.

In addition, there is a surge of interest in CMS by niche companies who provide some specialty services along parts of the chemical lifecycle. Most notable is activity and interest among environmental and Material Safety Data Sheet (MSDS) information management companies to form alliances with CMS providers to serve new markets. The new markets they are serving are characterized by low volume, highly diverse chemical product mix which requires a greater level of sophistication in the information technology to serve these customers. There is also interest by waste vendors to collaborate and understand the CMS market since the waste management piece of the chemical lifecycle is one of the service areas most CMS providers do not handle. Currently, CMS providers report that waste disposal is the one piece of the chemical lifecycle that is often not included in a contract. This is reinforced by responses where only 30% of the CMS providers stated that they would be interested in providing waste services. As we see more customers demand services for the entire lifecycle, alliances between waste management companies and CMS providers may be more common.

Selection Criteria

Among the customers we surveyed, 70% stated that the primary driver for them to initiate their CMS program was to reduce costs. This was reaffirmed in the customers' opinions on what is driving the overall market for CMS - the top two answers were operational efficiency and cost reduction.

However, there appears to be a disconnect between what providers believe is their customer's primary selection criteria and customer's actual selection criteria. When selecting a CMS provider, 67% of the customers claimed that the most important criteria was the provider's experience in providing specific chemicals. Interestingly, 77% of the providers felt that price was the most important decision criteria in choosing a CMS provider. Providers felt that experience and

Among the customers we surveyed, 70% stated that the primary driver for them to initiate their CMS program was to reduce costs.

information technology capabilities were next in line for decision criteria; however customers put a somewhat higher value on the provider's service quality and experience. It is unclear why there is a disconnect on selection criteria. One possible explanation is that some of the customer survey respondents were not part of the final decision-making process and thus their perspective is different than those who ultimately selected the CMS provider. Another possibility is that CMS providers are not getting consistent feedback on the final selection criteria.

More than half of the providers estimated that less than 20% of customers issuing an RFP really understand their true lifecycle chemical costs. However, it appears that shortly after adoption, customers rapidly become aware that the "true" cost of chemicals includes far more than purchase price, and that CMS providers can generate significant savings by serving the entire chemical lifecycle.

Characteristics of a CMS Program

The size and nature of CMS programs vary widely. The rate at which a company tests, evaluates, and then adopts the model corporate-wide also varies. In the case of General Motors(GM), there is a corporate mandate that all facilities adopt CMS. At United Technologies Corporation, CMS is a corporate initiative, but the business case for CMS is developed for each business unit and must get approval by that business unit.¹⁷ Other companies choose to test CMS at a single facility before implementing it company-wide.

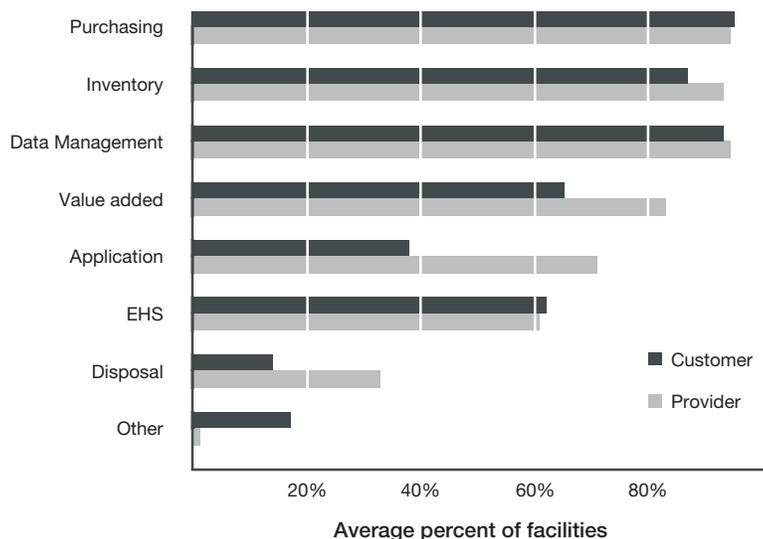
Scope of Services

Chemical management begins with procurement and extends through the use and disposal of chemicals. These activities make up the chemical lifecycle within a company. Of the customers we interviewed, 80% indicated that more than two-thirds of their chemical lifecycle activities are under their CMS contract.

Customers and providers noted that CMS programs most commonly include purchasing, inventory, and data management services (see Figure 4). 60% or more subscribe to EHS services and value-added activities,¹⁸ while fewer include application-related¹⁹ and disposal-related services. CMS providers claim most of the savings are from manufacturing process improvements over the life of a contract which often result from the value-added and application services. Therefore, it is no surprise that in response to a question regarding which activities CMS providers prefer to conduct, over 90% of the providers indicated they would like to provide “application services”. This is the most-cited desired activity that providers said they wanted to include in a program.

CMS providers claim most of the savings are from manufacturing process improvements over the life of a contract which often result from the value-added and application services.

Figure 4. Scope of Services Utilized by Customer Facilities



¹⁷ 7th Annual CSP/CMS Forum Workshop, October 23, 2003. Presentation by Brian Ross, UTC.

¹⁸ Value added activities include process efficiency improvements, repackaging, and other fee for services activities.

¹⁹ Application-related activities include delivery of chemical to point of use and chemical use activities (including application, change out, tool, or process management).

Hazardous waste disposal continues to be the one service that is most often not included in a CMS program.

For 92% of provider respondents, the average length of an initial CMS contract is three to five years.

Hazardous waste disposal continues to be the one service that is most often not included in a CMS program. This is likely due to several factors: 1) customers have generally managed their hazardous waste very closely in the past and have a robust management program; 2) packaging, transportation and final disposal pose a high liability for companies and they have conducted extensive audits of their current suppliers and are hesitant to hand over this responsibility to their CMS provider; and 3) CMS providers often can assist in packaging hazardous waste on-site, but do not have the infrastructure to support the transportation and final disposal. If customers expand their programs to include hazardous waste, it is probable that many CMS providers will sub-contract these services to a waste company. However, customer allegiance to a particular hazardous waste vendor may also provide opportunity for waste companies to begin offering CMS to the untapped CMS customer base.

Long-term contracts and increased scope over time are common.

For 92% of provider respondents, the average length of an initial CMS contract is three to five years. Increases in contract scope are also common as relationships are built, savings are achieved, and customers realize the value provided by the CMS program. According to customers, 70% of their programs have been extended or changed since inception. Most indicated the change was due to an extension or scope change and 80% indicated that they would consider additional scope increases.

CMS Contract Mechanisms

CMS contracts entail a wide variety of compensation and performance metrics and are generally unique for each customer. There is also a range in the legal complexity of contracts based on labor issues, a company's risk management approach, and compensation mechanisms employed. Successful programs have well-defined performance metrics and reporting requirements within the contract in addition to standard terms and conditions. A crucial element is for both parties to have a firm understanding of costs and performance, (accurate and mutually agreed upon baseline data,) before the CMS program is implemented.

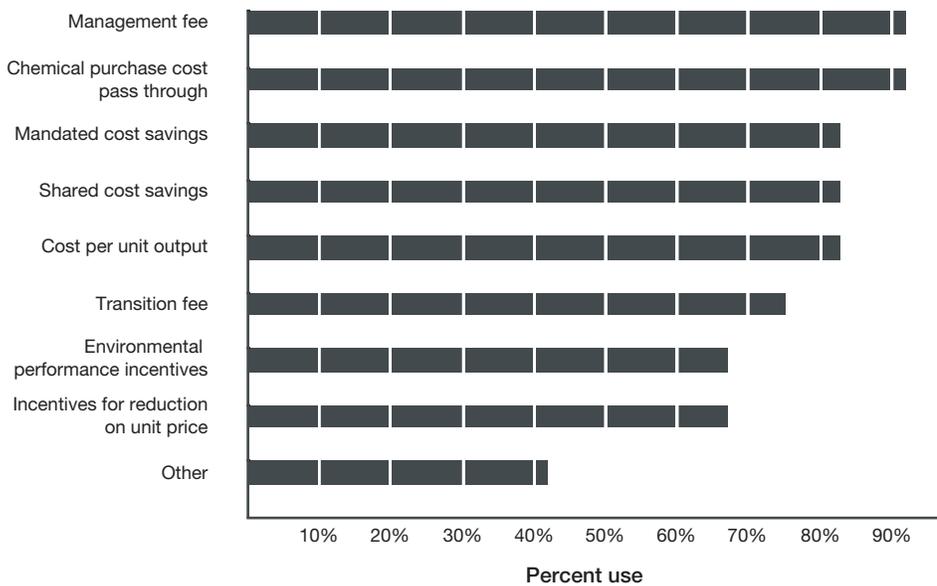
A common approach to bidding a contract is to propose the "last price paid" for a customer's total chemical purchases and then guarantee a reduction over the next three to five years. Thus, a deal is brokered where the customer does not pay any more than their current chemical purchase costs and is guaranteed savings. This works because customers often know their purchase costs even if they do not understand their total chemical lifecycle costs. Thus, it is an easier sell to upper management if annual "known" costs will decrease over time.

However, more recently, in discussions with CMS providers and customers, CSP has seen the emergence of management fees in addition to chemical purchase costs as a common approach. The management fees often amount to between 10-15% of the chemical spend. The fee structure is palatable to customers because often the management fees are expected to be paid for by the program cost savings.

Generally, there is a suite of compensation mechanisms used in a contract. Figure 5 below illustrates the frequency of use for different compensation mechanisms. As mentioned above, the most common approach is a combination of a chemical purchase pass through, with a management fee and some sort of cost savings incentive thrown in. In programs where the unit of production is well defined and constant (e.g. an automobile, an engine), a cost per unit output “chemical management fee” is employed. (For a description of compensation mechanisms, please see Appendix B.) The provider and customer negotiate terms and usually the customer dictates the combination of compensation mechanisms. Indeed, CMS providers noted that they have different compensation packages for different customers and none of the providers had a consistent compensation structure across all their customers.

Figure 5. Frequency of Use for Compensation Mechanisms – (provider response)

Note: Since a combination of several mechanisms are typically used, respondents selected more than one answer



Industry Performance

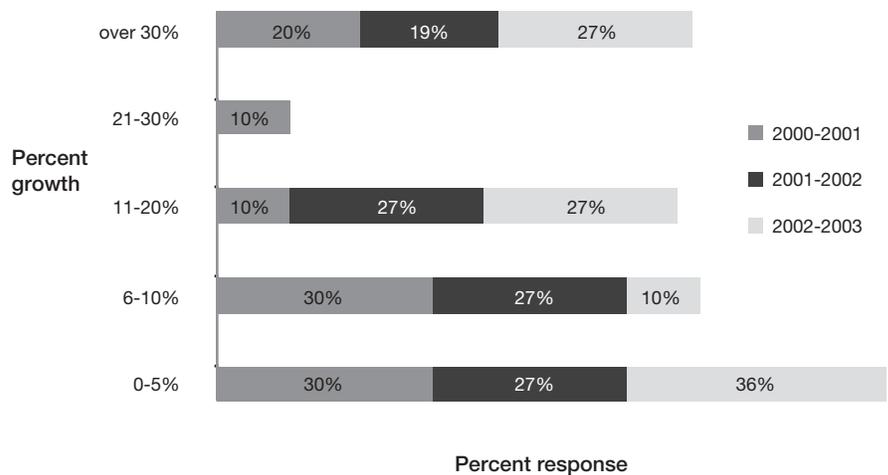
All of the respondents reported revenue growth over the past three years.

Current Performance: Providers

Revenue growth (2000-2003)

Approximately 80% of the providers responded to the survey question regarding CMS revenues over the past three years (see Figure 6). All of the respondents reported revenue growth over the past three years. There were significant differences in growth reported, but the overall trend reveals a rather dramatic growth in CMS revenues (ranging from 5-30% per year). Approximately 50% of the respondents cited growth greater than 10% per year over the past two years. The growth trend is driven by the new CMS providers entering the market as well as the general growth in CMS adoption in new sectors.

Figure 6. CMS Provider Estimated Revenue Growth 2000-2003 (provider response)



In 2003, profit margins ranged from 5-25%.

Profit margins remain strong

Only a few of the providers surveyed divulged information regarding their profit margins. For those who did, the margins remain strong as compared to 2000 margins. In 2003, profit margins ranged from 5-25%. Growth in profit margins since 2000 has been steady at about 5-10% per year and is projected to remain at 5-10% per year through 2006.

Sources of profits

Providers report several profit sources, but the top two sources of profits are from the 1) cost of services (e.g., management fees); and 2) shared savings or gainsharing activities from cost savings achieved. This contrasts to the responses in 2000, in which one of the top two sources of profits was from the commodities sold. This is an interesting shift considering that 75% of providers responding are chemical manufacturers. This may indicate the beginning of a shift toward higher value service being provided and rewarded in CMS contracts.

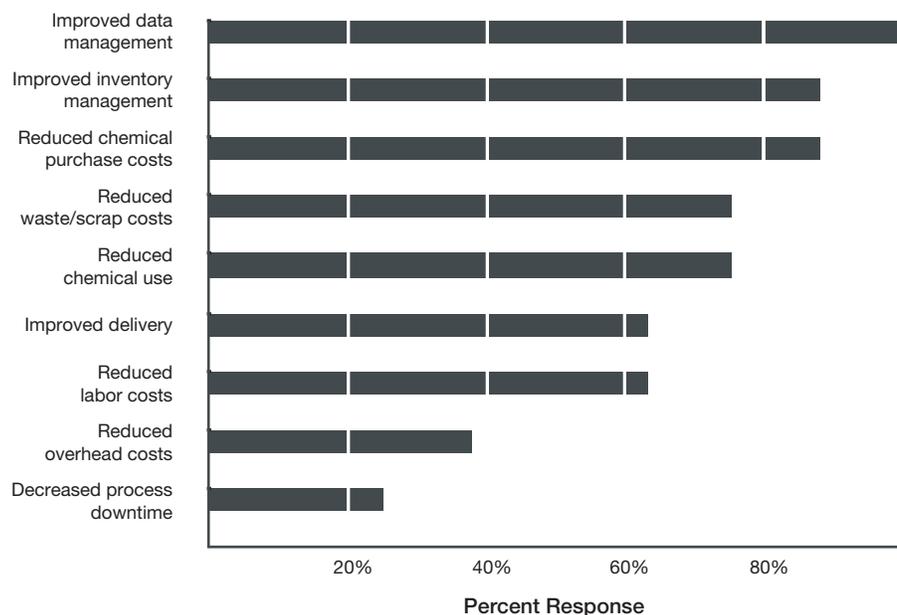
This is encouraging since many chemical producers have worried that they would have to give the service away to maintain the sales of their chemical product. It does not appear that this is happening.

CMS Program Performance: Customer Benefits

Customers have been very satisfied with the results of their CMS programs. The top three reported benefits are consistent with survey results in 2000. In Figure 7 below, we can see that customers realize the greatest results in improved data management, improved inventory management, and reduced chemical purchase costs.

Figure 7. Major Benefits Realized in CMS Programs (customer response)

Respondents selected more than one answer.



Financial Benefits

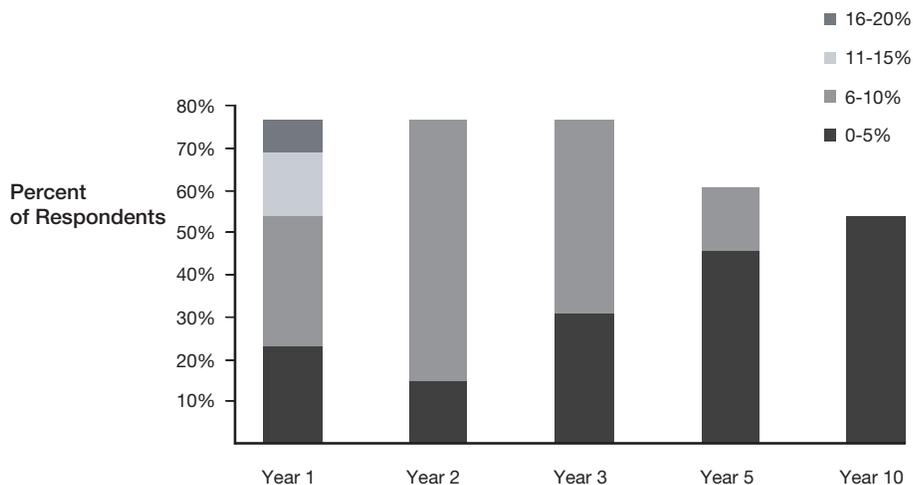
According to one of the first adopters of CMS, Raj Mishra of General Motors, “Every place we have put in a chemicals management program, the total chemical use and cost reduction averages around 30%.” These kinds of savings have been repeated at scores of other companies who have adopted CMS. In this survey, providers estimate that total savings from CMS range between 5-20% in the first year of implementation. Over the first three years of the contract, a majority of providers estimate 6-10% savings per year or more. As the CMS contract matures (after five years), savings level off at 0-5% per year (see Figure 8).

Customers realize the greatest results in improved data management, improved inventory management, and reduced chemical purchase costs.

Over the first three years of the contract, a majority of providers estimate 6-10% savings per year or more.

20 “Chemical Services Contracts Save, Yet Still They Languish,” *Business and the Environment*, Vol. XI, No. 12, December 2000, pg. 5.

21 CSP/CMS Forum workshops 2000, 2001, 2002, 2003.

Figure 8. Total Hard Savings Over the Life of a CMS Contract (provider response)

In the first year of a contract, the three primary sources of cost savings come from reducing the amount of chemical used, reducing the price of the chemical product, and improving manufacturing processes.

In order to understand the potential scope of savings, it is necessary to examine how the hard savings are realized. In the first year of a contract, the three primary sources of cost savings come from reducing the amount of chemical used, reducing the price of the chemical product, and improving manufacturing processes. Chemical use reduction in the first year of the contract often is achieved through improving inventory management. Reducing the price of chemicals can come from two areas. First, if the CMS provider is also a chemical manufacturer with a significant portion of the chemical spend of a customer, price breaks can bring quick savings in year one. Another approach is strong negotiating with Tier II suppliers and distributors. Many of these Tier I CMS providers are capable of leveraging their purchasing power from a broad customer base to negotiate better unit pricing on chemicals. Savings from improved manufacturing processes generally come from identifying the “low-hanging fruit” and implementing changes that can be done quickly.

When we look at long-term savings achieved in a CMS contract, chemical volume reduction and manufacturing process improvement emerge as the primary drivers for cost reduction. This is consistent with other data indicating that value is created in a CMS program by continuously improving manufacturing processes and ultimately reducing chemical inputs. This is the heart of what makes CMS a value proposition not only from a cost savings perspective, but from an environmental perspective.

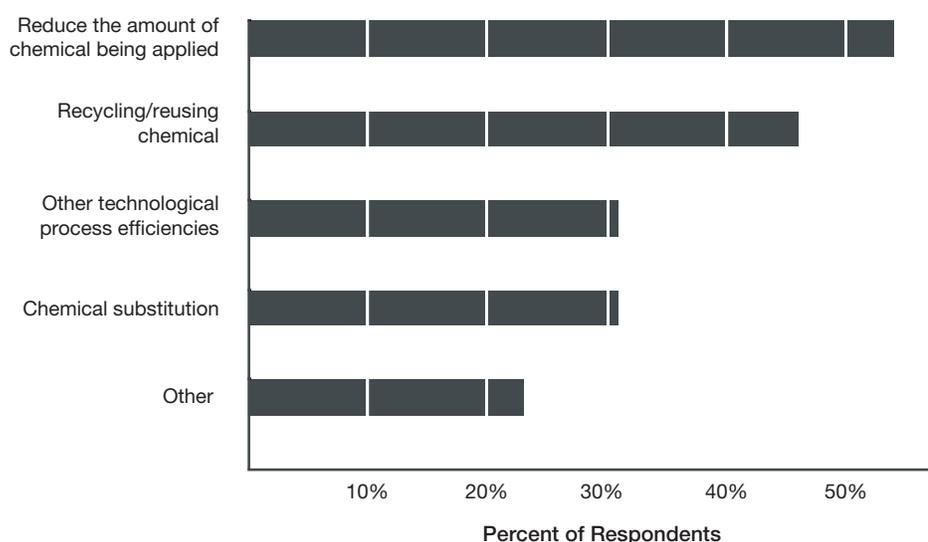
There are significant savings achieved and efficiency gained in a CMS program that can never fully be captured. These “soft savings” could include eliminating the 5-10% of an engineer’s time tracking down chemicals or 20% time of a procurement officer dealing with misplaced purchase orders. Though much more difficult to measure, providers estimated that total soft savings can range from 5-40% in any given year of the CMS contract.

Environmental Benefits

Cost saving data is consistent with the ability of CMS programs to achieve emissions reduction. 54% of providers indicated that they help their customers reduce emissions by reducing the amount of chemical being applied. Another 46% reduce emissions by implementing recycling or reuse alternatives. Chemical substitution and process efficiency were also cited as approaches to reducing emissions (see Figure 9 below).

Figure 9. Sources of Emission Reduction (provider response)

Respondents selected more than one answer.



Providing Continuous Value Over Time

Customers are very concerned that new technologies are being constantly pursued, vetted and presented to them. CMS providers have brought new technologies and chemistries to their customers using three kinds of approaches: 1) develop them internally; 2) utilize the Tier II base; and 3) use other third party consultants, academics, etc. Developing these new technologies and chemistries internally requires continuous investment. For chemical manufacturers, this is part of their corporate mandate and the research is generally not funded by the service division. For service-based providers, they either fund the effort themselves or partner with an outside party.

Customers are very concerned that new technologies are being constantly pursued, vetted and presented to them.

Two examples bear this out. General Motors worked with one of their CMS providers who is also a chemical manufacturer, Quaker Chemical, to improve the performance of a blankwash process. Quaker was successful in developing two new chemicals for the blankwash product, which resulted in fewer in-plant and downstream corrosion issues as well as reduced chemical use due to better

stability and improved formability.²² In a different facility, one of General Motors' service-based CMS providers, HaasTCM, implemented process efficiency improvements by teaming with a third party. The GM plant was suffering from poor leak detection in a dip tank that was resulting in a number of transmission leaks in the field and accounting for 40% of 90-day warranty claims. HaasTCM teamed with the Illinois Waste Management Research Center (WMRC) to develop a new membrane filtration system to clarify the dip tank water. The result of their collaboration was a new technology that reduced water and chemical consumption and improved leak detection. The successful project generated the first gainsharing check for HaasTCM and a new technology for WMRC to help replicate at other plants.²³

²² 7th Annual CSP/CMS Forum Workshop, Art Helmstetter, Quaker Chemical and Allan Flachsmann, General Motors, Pontiac, MI., October 23, 2003.

²³ 6th Annual CSP/CMS Forum Workshop, Thad Fortin, HaasTCM and Tim Lindsey, WMRC, Chicago, IL, October 24, 2002.

Growth Outlook

Growth Projections

Projected Revenue and Profit Growth

The industry's self-reported revenue and profit growth outlook is bullish. Half of the providers surveyed responded with revenue growth projections. They estimated that revenue growth in 2004 will be between 5-25%. One of the respondents expected to double their revenue in 2004 and again by 2006. Respondents were equally optimistic about growth in 2005 and 2006, estimating growth rates of 5-40%. Profitability growth rates are more measured at 5-10% annually for 2004 through 2006.

The double-digit profit margins and expectations for growth for the CMS industry are in contrast to the traditional chemical industry. Although chemical sales in 2003 for the top 50 companies worldwide increased 15% from the previous year, profit margins fell to 5.5%. This is part of a six year trend in decreasing profit margins for the chemical industry.²⁴ The current profit margin for the top 50 chemical manufacturers is less than half the profit margin the industry realized in 1997.

Thus, CMS is an area of positive profitability growth for an industry that is suffering from a continuous decline in profit margins. In addition, for the chemical industry, which is cyclical in nature, chemical management services can offer steady growth and an opportunity to build stronger relationships with customers.

Specific examples are emerging from chemical manufacturers. In a 2002 interview in *Chemical Week*, Houghton's Chairman and President, William MacDonald, said he expected that sales of the Houghton Fluidcare division (their CMS division) will double in the next five years and account for 40% of Houghton's total sales by 2007.²⁵

The large gas provider, Air Liquide, reports a similar shift in strategy. Cited as one of the top twenty breakthrough ideas of 2004 by the *Harvard Business Review*, Air Liquide's chemical management services now constitute about 25% of Air Liquide's revenues as compared to 7% in 1991. This move toward more services was directly in response to the threat of commoditization of Air Liquide's product lines.²⁶

Profitability growth rates are more measured at 5-10% annually for 2004 through 2006.

CMS is an area of positive profitability growth for an industry that is suffering from a continuous decline in profit margins.

²⁴ "Global Top 50: Top three companies change position as sales rise but profits slide," *Chemical and Engineering News*, Vol. 82, No. 29, July 19, 2004, pp. 11-13.

²⁵ Seewald, Nancy. "Houghton's Change of Direction, Metal Chemical Firm Moves into Chemical Management," *Chemical Week*, July 24, 2002.

²⁶ Slywotzky, Adrian and David Nadler. "The HBR List: Breakthrough Ideas of 2004", *Harvard Business Review*, February 2004, p.16.

62% of providers felt that they will realize the most growth in CMS opportunities with new customers.

The Nature of Growth

Over the past three years, CMS has grown steadily throughout sectors already using CMS as well as into new sectors. There are several drivers for this growth including increasing acceptance and popularity of CMS, a more experienced CMS provider base, and the larger business trend towards outsourcing non-core functions.

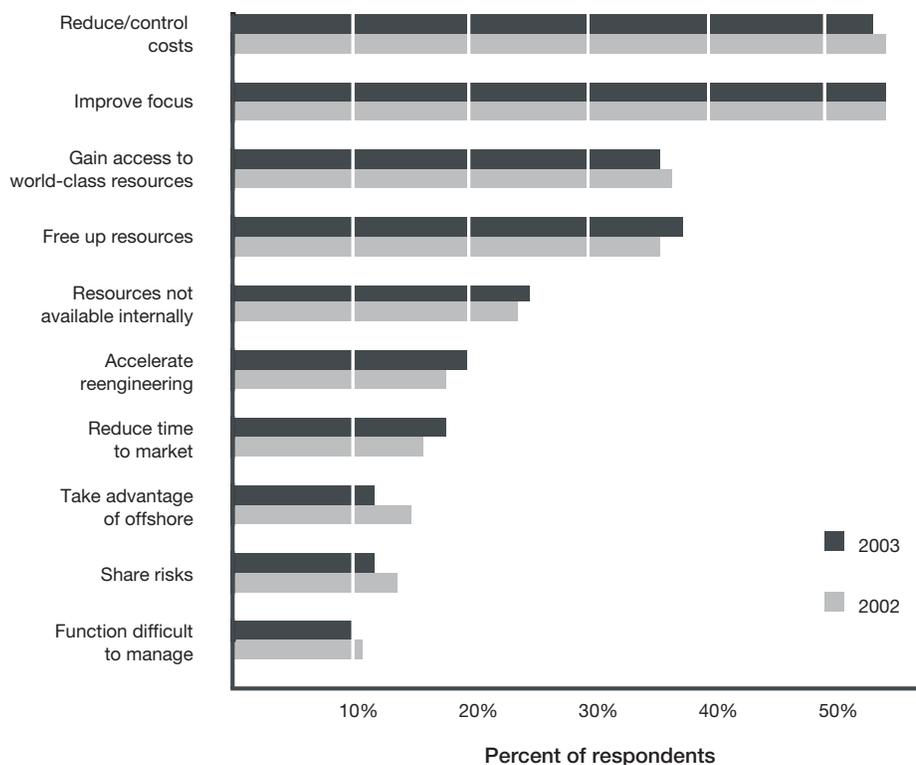
As was reported in the 2000 survey, CMS providers are optimistic about their growth opportunities. However, they have shifted their expectations for where that growth will be realized. 62% of providers felt that they will realize the most growth in CMS opportunities with new customers. This is quite different than the outlook in 2000, where 20% of providers felt that growth opportunities were with new customers. There are several factors that may be driving this shift. With a better educated customer base and the dramatic growth in the diversity of industry sectors now using CMS, there is more opportunity to expand the market in each of those sectors. The trend in profits derived more from services and away from commodity sales may indicate more service expertise being developed among the provider base and thus, a readiness to sell into new markets.

Larger Trends in the Business Context: Business Process Outsourcing

Business process outsourcing (BPO) services consist of the complete outsourcing of business functions based on the combination of technology, personnel, functional infrastructure and process methodologies. Companies have increasingly been seeking out BPO services, most commonly in the information technology area. However, in a recent report, Gartner Dataquest noted that, "BPO in general is increasingly being considered as a business strategy for enterprises that want access to best-in-class processes and cost predictability."²⁷ This is reflected in the responses to the 6th Annual Outsourcing Index. In 2002 and 2003, respondents indicated that outsourcing is more than just a cost reduction strategy. The top two reasons for outsourcing were reducing costs and improving focus. These reasons were followed by two other drivers: gaining access to world-class resources and freeing up resources (see Figure 10).

²⁷ "It's No Longer About Saving Money", 2003, Outsourcing Institute on-line, http://www.outsourcinginstitute.com/oi_index/no_longer2.html.

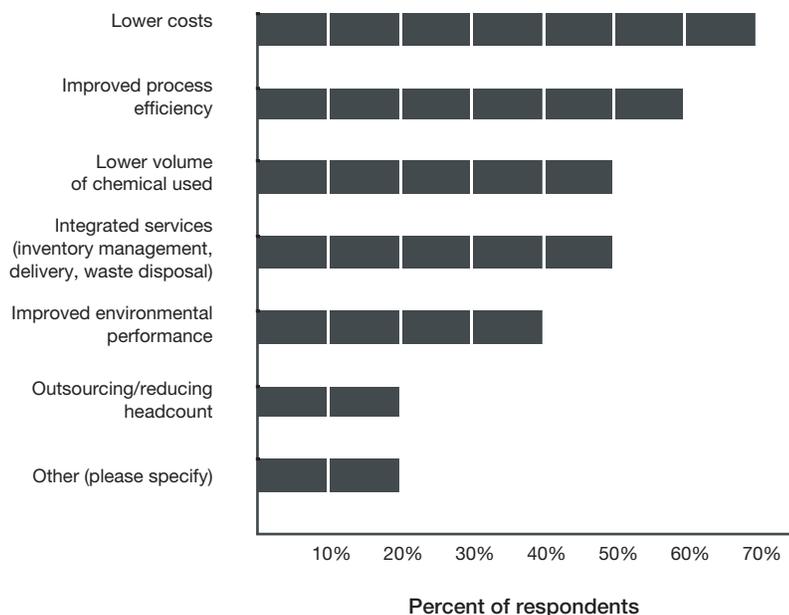
Figure 10. Top 10 Reasons Companies Outsource²⁸
Respondents selected more than one answer.



These drivers that motivate companies to outsource are the same drivers we see in the trend towards companies initiating CMS programs. Figure 11 is consistent with the Outsourcing Index indicating that lower costs are the top reason for purchasing CMS services. Improving process efficiency and acquiring an integrated service package ranked high as well.

²⁸ "6th Annual Outsourcing Index", 2003, Outsourcing Institute online, http://www.outsourcing.com/images/q403/index_chart_3.jpg

Figure 11. Primary Drivers for Purchasing CMS Services (customer responses)
Respondents selected more than one answer.



Looking deeper, there are two areas of the chemical lifecycle that are part of a growing trend in outsourcing: procurement and logistics.

Looking deeper, there are two areas of the chemical lifecycle that are part of a growing trend in outsourcing: procurement and logistics. According to a study by IDC, the worldwide procurement BPO market was \$5.3 billion in 2001 and the market is expected to grow at a 5-year compound annual growth rate (CAGR) of 18.2% to \$12.2 billion by 2006.²⁹ This trend in procurement outsourcing is confirmed by two additional surveys by consulting firms Aberdeen Group and Accenture. They both note that companies most frequently outsource non-strategic processes and indirect spend categories of the procurement function.³⁰ Logistics and materials management, or third-party logistics (3PL), has also been a growth area for the business process outsourcing industry. The US 3PL market has steadily grown over the past eight years.³¹ The most frequently outsourced activity is warehousing and transportation with an increasing capability to integrate sophisticated information management system to facilitate these activities. These growing outsourcing trends in both procurement and logistics point to a broader acceptance of looking externally for expertise in areas that do not constitute a core competency for customers.

²⁹ Presentation by FacilityPro Procurement Solutions, May 20, 2003.

³⁰ Accenture, 2003 *Procurement Outsourcing Survey*, November 2003,

http://www.accenture.com/xd/xd.asp?it=enweb&xd=services%5Cscm%5Cscm_procurement.xml and Aberdeen Group, *The Procurement Outsourcing Benchmark Report*, February 2004,

http://www.aberdeen.com/ab_company/hottopics/procurementoutsourcing/default.htm

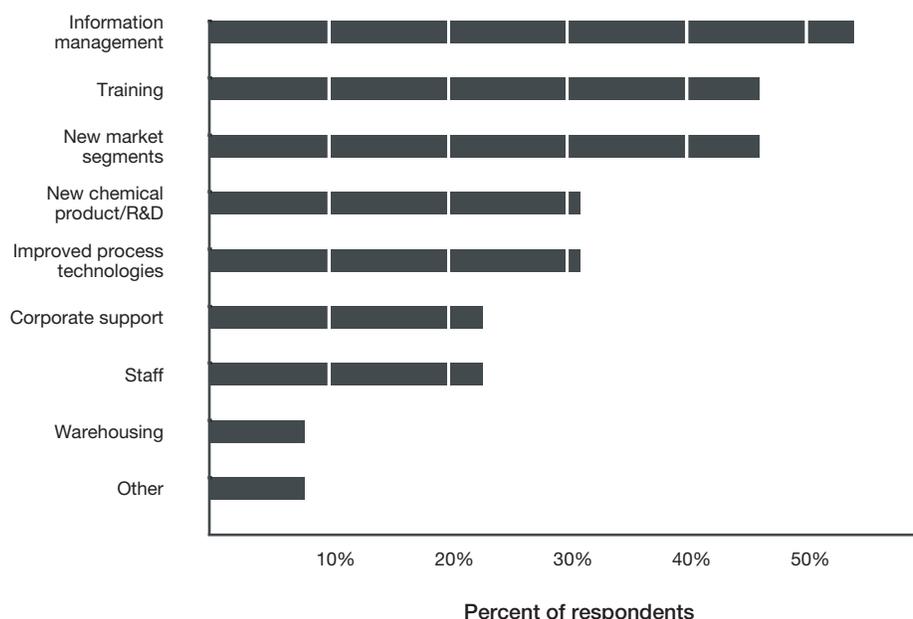
³¹ Caggemini, Georgia Institute of Technology, FedEx, *Third-Party Logistics, Results and Findings of the 2003 Eighth Annual Study*, p.6; and Armstrong & Associates, Inc. "US 3PL Market Grows 7%: Outpaces Economy", Press Release, April 9, 2003.

Planned Capital Investment

CMS providers appear aggressive in investing more resources to expand and deepen their CMS capabilities. In 2000, a top priority for investment was information management. Companies reported that as part of their internal growth strategy, 93% expected to invest in information management capabilities and 80% would invest in staff and additional improvement technologies. However, in 2004, there was more diversity in the nature of future investments (see Figure 12). Just over 50% indicated that they will invest in information technology, while investments in training, new market segments and improved chemical and process technologies rated high.

However, in 2004, there was more diversity in the nature of future investments

Figure 12. How Providers are Investing to Grow their CMS Product/Service Capacity
Respondents selected more than one answer.



This trend indicates that the projected investment in information management started over the past few years and continues to be implemented. It also indicates that providers are investing for future growth in new markets and building their staffing capabilities to better serve new and existing clients. Overall, this investment pattern is a strong sign of the health of the CMS market.

Role of the Internet and Information Management

In the 2000 survey, there was almost no reported use of the internet or e-commerce in CMS. Many providers received orders by e-mail or the internal electronics systems standard to some customers. As of 2004, 70% of providers indicated that they provide a web-based platform for purchasing and inventory transactions. In addition, all CMS customers surveyed indicated that their CMS provider used a web-based MSDS system.

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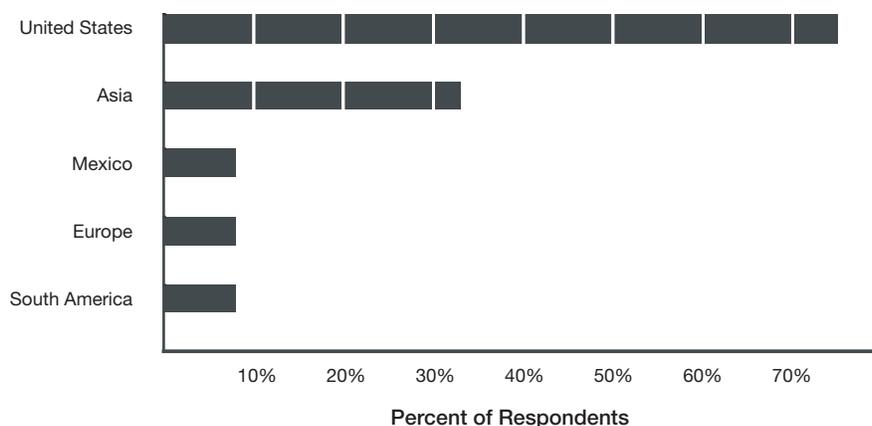
A potential benefit to a strong web-based IT system may be to provide better access to tap into the smaller customer market. For customers who purchase under \$1 million in chemicals, it is difficult for providers to justify on-site personnel. The internet could be used to pool customer purchases and provide analysis and assistance without full time personnel on-site. For example, one provider wanted to seek out aerospace customers in the Pacific Northwest. The customers had small chemical buys, and individually, it would have been cost prohibitive for them to engage in a CMS contract (too expensive for the customer to sign up and too costly for the provider to implement). The CMS provider, therefore, approached the Pacific Northwest Aerospace Association (PNAA) to develop a consolidated sell with about 10-15 prospective clients. This approach—to combine several small accounts into a consolidated contract—is one way to increase small volume account revenue.

As the diversity of industry sectors using CMS grows, information management capabilities will likely become more vital to a CMS provider. In order to provide a service offering that will appeal to a broad range of customers, the common denominator of a strong IT backbone will be critical for a CMS provider. With good insight into a customer's buying habits, chemical use patterns, waste patterns, etc., a provider is in a position to capitalize on efficiencies with more speed and precision. When customers were asked how important the information management capabilities of the CMS provider were in their selection process, 90% responded "critical" or "very important".

Global Growth

Currently, there are CMS programs in Canada, Europe, the UK, Mexico, South America, and Asia. Approximately 40% of the providers surveyed have CMS programs outside of the U.S. About half of the international programs stem from multi-national companies based in the U.S. who are rolling out their CMS programs to facilities worldwide. The other half of the programs have originated in the country. However, 75% of providers see the greatest growth potential for CMS in the United States (see Figure 13). This reflects the difficulties CMS providers have faced in expanding the CMS business model into international markets.

75% of providers see the greatest growth potential for CMS in the United States.

Figure 13. Region Where Greatest Growth in CMS is Expected (provider response)*Respondents selected more than one answer.*

CSP has conducted research in both Asia and European regions where potential growth for CMS is most ripe. There is growing activity in Mexico and South America, but there has been no formal government support or research conducted in those regions.

Asia

Despite the tremendous growth in chemical consumption in many of Asia's manufacturing hubs, CMS remains far less adopted there than in the U.S. Only a few CMS programs are currently in place in Asian facilities, mainly in the automotive and electronics industries in Singapore and China. While the majority of these programs were initiated by U.S. multi-nationals as part of their corporate policies, there are a handful of local Asian companies that have initiated CMS programs. Of the few CMS providers that are pursuing CMS in Asia, most do not expect tremendous growth in the short term.

There are a number of key reasons why CMS is not utilized in Asia. First among these is that business in Asia has yet to recognize the true value of services and continues to place high priority on the price of the commodities being purchased. This prevents CMS providers from making a clear case for added value and efficiency through their CMS offerings. At the same time, manufacturing growth is explosive and consideration of a more sophisticated supply chain model such as CMS does not get management attention at this time. Culturally, there is a question as to whether the concept of outsourcing (or even "insourcing", as CMS may be considered) is fundamentally acceptable as a business model.

Despite the tremendous growth in chemical consumption in many of Asia's manufacturing hubs, CMS remains far less adopted there than in the U.S.

Comprehensive CMS programs in Europe have been largely limited to the automotive and aerospace sectors.

In the last few years, considerable interest in the CMS concept has come from governments and research institutes who see the potential for CMS to achieve joint environmental and business objectives.

CMS providers also face heavy capital investments when considering investing in CMS operations in Asia. The lack of efficient infrastructure for logistics and warehousing pose hurdles that will only be overcome through incremental growth in customer contracts and strategic partnerships between existing suppliers. CMS providers will likely need to develop partnerships and distribution networks to build an integrated supply chain from source to facility.

Europe

Similar to Asia, a driver for CMS in Europe is large multi-national companies who demand a range of services based on success they have had with CMS programs in their plants in other countries, most notably in North America. Thus, comprehensive CMS programs in Europe have been largely limited to the automotive and aerospace sectors.³²

The majority of CMS providers in Europe are large international chemical companies. Despite such a strong CMS provider base, uptake of CMS has been slower than in North America.³³ In general, the barriers in Europe are similar to the barriers to adoption of CMS in North America (discussed in the next section). Barriers for customers include a lack of awareness of the CMS model and a perception that many chemical functions are too complex or too important to give to a supplier. Interestingly, there is also a lack in confidence in the CMS provider community since CMS is still relatively new with few success stories in Europe. For providers, they see general business risk as well as educating and selling CMS to prospective customers as the major barriers. Europe has some unique features including: 1) the many distinct cultures and regulatory drivers that comprise the “common market”; and 2) the large number of small and medium-sized facilities where the economy of scale may not warrant full time CMS personnel on-site.

The new European Union chemicals directive (Registration, Evaluation, and Authorisation, of Chemicals: REACH) may serve as a driver for CMS services. REACH requires information transfer between chemical manufacturers and the downstream user. CMS providers may be able to help their customers be aware of chemicals impacted by REACH, identify alternatives, and help facilitate the necessary information transfer.

Overall, the prospects for growth of CMS in Europe are high. In the last few years, considerable interest in the CMS concept has come from governments and research institutes who see the potential for CMS to achieve joint environmental and business objectives. Green Alliance, a UK based environmental NGO, completed a research project “Service Innovation for Sustainability” in 2003 that looked at CMS as a means to achieve resource productivity. In Austria, the Federal Ministry of Agriculture, Forestry, Environment and Water Management

³² Oldham, J., Votta, T., (2003) “Chemical Management Services, Greening the Supply Chain, *Greener Management International*, Spring 2003, pp. 89-100. Notable programs include: PPG & OPEL; Castrol & Airbus; Dupont & Volvo.

³³ Oldham, J., Votta, T., (2003) “Chemical Management Services, Greening the Supply Chain, *Greener Management International*, Spring 2003; 89-100.

sponsored a study to identify the potential of CMS. This study claimed that CMS, or “chemical leasing”, has the potential to reduce consumption of chemicals by 33% in areas related to greasing, cleaning, and fluid management.³⁴ In 2003, Austria hosted an Organization for Economic Cooperation and Development (OECD) conference on “Experiences and Perspectives of Service-Oriented Strategies for the Chemical Industry and Related Areas”. This conference brought together numerous stakeholders to evaluate the various attempts to implement service-oriented strategies in Europe. Finally, in August 2004, the European Union has put forth a call for proposals to evaluate the market potential for CMS in Europe and likely environmental impacts. In aggregate, these initiatives will raise awareness, evaluate the business case, and look at the environmental potential for CMS.

³⁴ Jakl, T., R. Joas, R.F. Nolte, R. Schott and A. Windsperger (2004) *Chemical Leasing: An Intelligent and Integrated Business Model with a View to Sustainable Development in Materials Management*, 2004 (Vienna/New York: Springer-Verlag).

Barriers to Growth

In the 2000 Report, we identified three major barriers that are slowing the rate of adoption of CMS across all industry segments:

1. Lack of public information about the value of CMS
2. Confusion in the marketplace and lack of standards
3. Internal barriers within the customer organizations including lack of focus to address a small cost center (i.e., chemicals), perceived high transaction costs to implement CMS, and the operational risk concerns

The first and second barriers are beginning to dissipate due to the growing popularity of the CMS model and the increasing amount of information being shared through CMS Forum workshops, case studies, and publications. The third barrier remains an issue with new CMS customers. Additionally, other barriers are becoming more prevalent.

1. Narrow solutions appear to offer customers an alternative to CMS

There are two major trends that pose a threat to full acceptance of CMS: strategic sourcing initiatives (leveraged purchasing) and stand-alone chemical information management software.

Leveraged Purchasing

Strategic sourcing has been aggressively pursued by most major companies over the past five years and was identified as a barrier to CMS in the 2000 report. It generally involves leveraged purchasing arrangements that rely on pooling purchases across a company to generate per unit price reductions. Led by procurement departments, they are aggressively pursuing strategic sourcing and their performance is often evaluated in metrics that track their success in achieving commodity price reductions. However, chemicals are a different from other commodities since they have significant management costs associated with them. Some of the more sophisticated procurement efforts are tracking product “total cost of ownership”. In this case, procurement professionals are evaluated on their success in driving down the total cost of ownership and not just per unit price reductions.³⁵ In these companies, the CMS approach is more readily accepted and highly valued.

Chemical Information Management Software

The shift in chemical tracking software to web-based systems has presented a powerful new resource to customers looking for information systems that will help them track data for environmental reporting. Customers who are actively upgrading their information management systems often feel they have their chemical management under control. For the first time they have some visibility

Some of the more sophisticated procurement efforts are tracking product “total cost of ownership”.

³⁵ “*The Competitive Supply Chain, the value of integration*”, Institute of Supply Management Conference, Kent Brittan, Vice-President, United Technologies, November 11, 2002.

into chemicals residing on site and a quicker method for compiling data for environmental reports. However, we have consistently seen that companies with sophisticated chemical information systems do not fully utilize the system's capabilities and opportunities to improve chemical management are rarely implemented. A company has a powerful tool with few to no resources to achieve the efficiencies and savings it can yield. One company CSP has met with purchased a sophisticated IT system and got it functional, but then it went unused for two years. They are now in the process of retraining staff to simply input the data again. It will be another year before they will analyze the data to improve inventory turn rates, rationalize supplier diversity, reduce waste from unused chemical, and identify less toxic substitutes. Purchasing a powerful software package is no substitute for active chemical management, but it is often perceived as such.

2. The RFP/bidding process is inefficient

This is a barrier identified in the 2000 report and it still remains a significant issue for CMS providers. Although the 2004 survey did not specifically ask about the RFP process, feedback from the industry indicates there has not been much progress. The bid process is still long (6-12 months), in some cases contracts have never been awarded, and in other cases, a contract has been signed but the program does not get initiated. Where CMS is being tried in new sectors, such as government (i.e. DOD, DOE) and universities, the high level of bureaucracy often extends the award time significantly. In the case of Stanford Linear Accelerator Center, five years passed from the time they began investigating CMS as an option to program kick-off.

3. Lack of visibility for the total cost of chemicals

Reducing chemical use and chemical management costs is generally not a corporate priority. The perceived costs of purchasing and managing chemicals are often calculated as comprising less than 1% of operating costs for a company. However, conventional accounting systems typically do not reveal the actual lifecycle costs of chemical use. As mentioned earlier, studies estimate that the cost of chemical management can range from one to ten times the purchase cost of chemicals. Costs of existing chemical management systems are not known because many relevant costs are pooled in overhead accounts and the chemical management activities are decentralized and diffuse throughout the customer's organization. This issue is compounded by the notion that many companies already believe they are doing the best possible job and there is little room for improvement.

Purchasing a powerful software package is no substitute for active chemical management, but it is often perceived as such.

Recommendations

From our report findings, we have compiled the following recommendations:

1. Identify pathways to continuously deliver new technologies and improved chemistries

A successful CMS program needs to deliver continuous value to the customer. Identifying and implementing new technologies and chemistries will be a key aspect of the value proposition. With a new layer in the supply chain, how is the customer assured they will continue to be exposed to new technologies? Or from an alternate perspective, how are Tier II suppliers ensured they will have access to customers to provide continuous innovation?

Only 30% of the CMS provider respondents indicated that they utilize their Tier II suppliers for technical or on-site assistance regularly. CMS providers need to ensure timely flow of information between the customer and Tier II providers to assist in developing next generation optimization solutions. CMS providers should also look to third party institutions (e.g. government-funded research and academic institutions) to assist in innovating for their customers. As for the customer, they need to commit the resources to work with their CMS provider to successfully introduce new technologies and chemistries.

2. Develop strategies to deliver value to customers with smaller chemical spend³⁶

The potential market for smaller facilities is significant. Based on estimates cited earlier for the potential CMS market size, there could be as much as \$35 billion in specialty chemical purchases by small and medium-sized enterprises (SME). Currently, it is difficult to cost-effectively implement a CMS program at a facility that purchases less than \$1 million in chemicals annually. Yet the irony is that the smaller companies are the most in need of assistance in managing their chemicals because they often do not have the infrastructure to manage the chemical lifecycle well. For continued growth of CMS, strategies for serving the SME market need to be developed and implemented. Possible strategies include:

A. *Develop technologies and training to effectively deploy part-time CMS staff*

Key to the success of these programs would be to deliver high-value process improvements that extend machine life, reduce downtime, or reduce chemical use and costs. Developing remote technologies or training staff to identify and implement process improvements could be an effective strategy for delivering good value at a low cost to the provider.

³⁶ Bierma, Thomas and Frank Waterstraat. "Chemical Management Services - Focused Studies: CMS in Small and Medium Enterprises", *WMRC Reports*, April 2004, RR-104, <http://www.wmrc.uiuc.edu>. Eight specific recommendations are outlined for overcoming barriers to implementing CMS in SME companies.

B. *Bundle additional services to create a value-added CMS package*

To create a package of services with a value large enough for a CMS program to be viable, CMS providers may consider targeting costs and providing potential services in the following areas:

- Waste treatment and disposal costs—including management of waste treatment operations
- Equipment and tool life—including purchase and management of tools
- EH&S—including management of EH&S services (reporting, MSDS management, training, etc.)
- Product quality/scrap/rework costs
- Energy costs related to chemical management
- Process downtime costs
- Process engineering service

C. *Develop innovative pricing strategies*

In their research, professors Bierma and Waterstraat at Illinois State University identified a CMS supplier that developed an innovative pricing strategy with four of its smaller accounts. Instead of the standard fixed fee pricing approach, the supplier used a combination of:

Chemical cost pass-through—price of chemicals passed through to the buyer – generally somewhat below the price previously paid by the buyer.

CMS management fee (usually very small)—the fee was used to offset purchasing, inventory management, and other basic services provided by the supplier.

Gainsharing—an agreement to split the savings derived from process improvement projects. In one particularly successful program, the supplier reduced scrap costs by 87% and was able to share in those savings with the SME customer.

3. **Focus education and outreach towards supply chain management professionals**

As customer companies gain more of a sophisticated approach to purchasing and supply chain management, the CMS model will resonate better with their objectives. There is a trend toward taking a larger view of the total cost of sourced products to the enterprise. For example, UTC works to reduce their internal costs associated with sourcing a particular product, but then they also consider opportunities to help reduce the supplier's costs to provide the product.³⁷ When purchasing professionals look at issues of risk, end-of-product costs, corporate procurement activity, and the suppliers' cost basis, they open themselves to learning about new supply chain strategies such as CMS. When they are rewarded for delivering such enterprise cost reductions, then they will be more aggressive about implementing CMS. More outreach and education about the

³⁷ *The Competitive Supply Chain, the value of integration*, Institute of Supply Management Conference, Kent Brittan, Vice-President, United Technologies, November 11, 2002.

CMS model should be directed toward purchasing and supply chain management professionals to link with this new trend and identify how CMS can meet the mandates within their company.

4. Develop strategies for promoting CMS internationally

There is significant growth potential for CMS internationally. CMS providers need to develop the right cultural approach to sell CMS in the different international regions, but also the logistical infrastructure to support CMS. Governments in Asia and Europe are currently playing a role in evaluating CMS as an economic development and environmental improvement opportunity. Expanding these initiatives could go far to reduce the informational, cultural, and financial barriers to adoption of the CMS model.

5. Enhance the industry-wide capability to track and publish financial and environmental results from CMS programs

The industry group, CMS Forum, provides research, education and promotional activities for the CMS industry. Started in 2000, membership in the CMS Forum has increased to include most of the CMS providers and several customers. The CMS Forum should continue to aggressively build its membership and its outreach activities. The most compelling information for successfully promoting CMS is good case study data and industry market data. Members of the Forum should more fully participate in industry research activities and case study development.

Appendices

Appendix A: Sample surveys

Sample CMS Provider Survey

Please return this survey by April 26th, 2004 to:

Michelle Sargent
 Chemical Strategies Partnership/CMS Forum
 423 Washington Street, 4th Floor
 San Francisco, CA 94111
 Fax: (415) 421-3304

Instructions: Please complete the survey as fully as possible. This survey has four sections and 51 questions. All responses are confidential and will be masked by the CMS Forum. We expect this survey should take about one hour to complete. It may be necessary to track down some information, which may require input from your colleagues. For the purposes of this survey, we consider a “customer” to be one facility, as opposed to an entire company. If you have any questions, please contact Michelle Sargent at (415) 421-3405 x14 or michelle@chemicalstrategies.org. Thank you for your time!

Name of Company

Person/s completing the survey

Title/Position

Phone Number

Fax Number

Email Address

A. ORGANIZATION PROFILE

A.1 Company Profile

___ 1. Type of Organization (select all that apply):

- | | |
|---|--|
| <input type="checkbox"/> a. CMS Provider – Tier I | <input type="checkbox"/> d. Distributor |
| <input type="checkbox"/> b. CMS Provider – Tier II* | <input type="checkbox"/> e. Waste Vendor |
| <input type="checkbox"/> c. Chemical Manufacturer | <input type="checkbox"/> f. Engineering/Consultant |

**A Tier II CMS provider is any subcontractor on a CMS contract who provides product, commodities, and/or services to the Tier I/customer.*

___ 2. Do you have a separate division (business unit equivalent) that provides CMS services?

- a. Yes
 b. No

___ 3. Division providing CMS services:

___ 4. CMS Program Name:

Size and Revenues: Company

___ 5. Size (# of Employees) of total company:	___ 6. Annual total sales (revenue \$) (product, services, fees, etc.):
<input type="checkbox"/> a. 0 – 50 <input type="checkbox"/> b. 51 - 100 <input type="checkbox"/> c. 101 - 500 <input type="checkbox"/> d. 501 – 1,000 <input type="checkbox"/> e. More than 1,001 <input type="checkbox"/> f. More than 10,000	<input type="checkbox"/> a. Less than \$50 million <input type="checkbox"/> b. \$50 million - \$100 million <input type="checkbox"/> c. \$100 - \$200 million <input type="checkbox"/> d. \$200 million- \$500 million <input type="checkbox"/> e. \$500 million – \$1 billion <input type="checkbox"/> f. More than \$1 billion

Size and Revenues: CMS division (If Applicable)

___ 7. Size of CMS Division (# of Employees):	___ 8. Annual total CMS sales revenue \$ (chemical product, services, fees, etc. associated with CMS contracts):
<input type="checkbox"/> a. 0 - 10 <input type="checkbox"/> b. 11 - 25 <input type="checkbox"/> c. 26 - 50 <input type="checkbox"/> d. 51 - 100 <input type="checkbox"/> e. More than 100 <input type="checkbox"/> f. More than 300 <input type="checkbox"/> g. Not Applicable	<input type="checkbox"/> a. Less than \$50 million <input type="checkbox"/> b. \$50 million - \$100 million <input type="checkbox"/> c. \$100 - \$200 million <input type="checkbox"/> d. \$200 million- \$500 million <input type="checkbox"/> e. \$500 million – \$1 billion <input type="checkbox"/> f. More than \$1 billion <input type="checkbox"/> g. Not Applicable

___ 9. How many customers do you currently provide a CMS program to?

- a. Total number of companies
- b. Total number of facilities

___ 10. Do you sell your own product to your CMS customers?

- a. Yes (continue)
- b. No (skip to question #13)

__ 11. What percentage of chemical product provided to your CMS customer is your company's product?

- | | | |
|------------------------------------|------------------------------------|---|
| <input type="checkbox"/> a. 0-20% | <input type="checkbox"/> c. 41-60% | <input type="checkbox"/> e. 81-100% |
| <input type="checkbox"/> b. 21-40% | <input type="checkbox"/> d. 61-80% | <input type="checkbox"/> f. Too highly variable among customers to generalize |

__ 12. What percentage of your company's total product sales is to CMS customers?

- | | | |
|------------------------------------|------------------------------------|---|
| <input type="checkbox"/> a. 0-20% | <input type="checkbox"/> c. 41-60% | <input type="checkbox"/> e. 81-100% |
| <input type="checkbox"/> b. 21-40% | <input type="checkbox"/> d. 61-80% | <input type="checkbox"/> f. Too highly variable among customers to generalize |

__ 13. How long has your company been offering CMS programs? years

A.2 Industry Market Focus

__ 14. In which market(s) do you currently have CMS contracts/programs? For each market, indicate the type of market segments (facility groups) if applicable.

- | | |
|--|--|
| <input type="checkbox"/> a. Automotive | <input type="checkbox"/> g. Energy/Utilities |
| <input type="checkbox"/> b. Automotive Suppliers | <input type="checkbox"/> h. Steel Manufacturers |
| <input type="checkbox"/> c. Heavy Equipment | <input type="checkbox"/> i. Misc. Manufacturers (appliances, etc.) |
| <input type="checkbox"/> d. Aerospace | <input type="checkbox"/> j. Food/Beverage |
| <input type="checkbox"/> e. Electronics | <input type="checkbox"/> k. Research/Lab |
| <input type="checkbox"/> f. Air Transport | <input type="checkbox"/> l. Other: |

__ 15. Approximately how many companies do you serve in each market

- | | |
|--|--|
| <input type="checkbox"/> a. Automotive | <input type="checkbox"/> g. Energy/Utilities |
| <input type="checkbox"/> b. Automotive Suppliers | <input type="checkbox"/> h. Steel Manufacturers |
| <input type="checkbox"/> c. Heavy Equipment | <input type="checkbox"/> i. Misc. Manufacturers (appliances, etc.) |
| <input type="checkbox"/> d. Aerospace | <input type="checkbox"/> j. Food/Beverage |
| <input type="checkbox"/> e. Electronics | <input type="checkbox"/> k. Research/Lab |
| <input type="checkbox"/> f. Air Transport | <input type="checkbox"/> l. Other: |

A.3 CMS Program Scope

__ 16. For the average contract, what portion of your customer's chemical buy is included in your programs? (as a percentage of total spend on chemicals for the facility)

- | | | |
|------------------------------------|------------------------------------|--|
| <input type="checkbox"/> a. 0-20% | <input type="checkbox"/> c. 41-60% | <input type="checkbox"/> e. 81-100% |
| <input type="checkbox"/> b. 21-40% | <input type="checkbox"/> d. 61-80% | <input type="checkbox"/> f. Don't know |

__ 17. The following is a list of potential CMS services that could be offered within a CMS program. Please approximate the percentage of your customers (e.g. facilities) who utilize these services.

Purchasing: ____% Sourcing (involves engineering component); Procurement (executing buys)

Inventory: ____% Receiving; Inspection (incl. verification); Testing; Labeling; Re-certification; Warehousing

Application: ____% Delivery to point of use; Use (application, change out, tool, or process management)

Value added: ____% Process efficiency improvements; Repackaging; Other fee for service

Data Management: ____% Order tracking; MSDS Management; Customer use tracking; Chemical use (vol.)

Disposal: ____% Waste collection on-site; Waste water treatment plant operation

EHS services: ____% Support for compliance reporting (TRI, air emission reports, manifests, etc.); Emergency preparedness/response

Other: ____%

Other:

__ 18. What is your Company's preferred scope of services (*your "dream contract"*) *Select all that apply.*

- | | |
|---|--|
| <input type="checkbox"/> a. Purchasing activities | <input type="checkbox"/> d. Environmental activities |
| <input type="checkbox"/> b. Inventory management activities | <input type="checkbox"/> e. Disposal activities |
| <input type="checkbox"/> c. Application activities | |

__ 19. What percentage of your contracts has full time staff on site?

- | | | |
|------------------------------------|------------------------------------|-------------------------------------|
| <input type="checkbox"/> a. 0-20% | <input type="checkbox"/> c. 41-60% | <input type="checkbox"/> e. 81-100% |
| <input type="checkbox"/> b. 21-40% | <input type="checkbox"/> d. 61-80% | |

__ 20. What percentage of your contracts uses Tier II suppliers to provide technical or some sort of on-site assistance?

- | | | |
|------------------------------------|------------------------------------|-------------------------------------|
| <input type="checkbox"/> a. 0-20% | <input type="checkbox"/> c. 41-60% | <input type="checkbox"/> e. 81-100% |
| <input type="checkbox"/> b. 21-40% | <input type="checkbox"/> d. 61-80% | |

__ 21. What is the average length of a contract?

- | | |
|---------------------------------------|--|
| <input type="checkbox"/> a. 1-2 years | <input type="checkbox"/> c. > 5years |
| <input type="checkbox"/> b. 3-5 years | <input type="checkbox"/> d. Open contracts |

__ 22. Do you provide a web-based platform for purchasing and inventory transactions?

- a. Yes
- b. No

__ 23. Indicate the approximate percentage of your CMS contracts that contain the following compensation elements. (*select all that apply*)

<input type="checkbox"/> a. Transition fee <input type="checkbox"/> Volume Driven <input type="checkbox"/> Fixed <input type="checkbox"/> Mixed	_____ %
<input type="checkbox"/> b. Management fee <input type="checkbox"/> Volume Driven <input type="checkbox"/> Fixed <input type="checkbox"/> Mixed	_____ %
<input type="checkbox"/> c. Chemical purchase cost pass-through	_____ %
<input type="checkbox"/> d. Cost per (or fixed price/unit output – “unit pricing”)	_____ %
<input type="checkbox"/> e. Mandated Cost Savings	_____ %
<input type="checkbox"/> f. Incentives for reduction on commodity unit price	_____ %
<input type="checkbox"/> g. Shared cost savings (shared upside)	_____ %
<input type="checkbox"/> h. Environmental performance incentives	_____ %
<input type="checkbox"/> i. Other:	_____ %

B. INDUSTRY STRUCTURE

B.1 Industry Definition

__ 24. In an effort to standardize the definition of CMS across industries, please take a moment to read the following definition. Is the following definition for “Chemical Management Services” in line with the definition of chemical management related services offered by your company?

A strategic, long-term relationship in which a customer contracts with a service provider to supply the customer's chemicals and to manage related services. Under a CMS contract, the provider's compensation is tied primarily to quantity and quality of services delivered, rather than to chemical volumes sold. CMS goes beyond invoicing and delivering products to optimizing processes, continuously reducing chemical lifecycle costs and risk, and reducing environmental impact.

- a. Yes
- b. No

__ 25. Please indicate how you would change this definition:

__ 26. What percentage of your programs (contracts) conform to the definition of CMS stated in question 24?

a. 0-20%

b. 21-40%

c. 41-60%

d. 61-80%

e. 81-100%

f. Don't know

B.2 Market Size

__ 27. Approximately how much revenue do you realize in each market sector? Approximately how much of that revenue is for chemical product? Please indicate what percent is from the US market only, versus international markets.

	NA	CMS Revenues (\$)	Percentage that is product (%)	What percentage of this revenue/product is US only?
Automotive				
Automotive Suppliers				
Heavy Equipment				
Aerospace				
Electronics				
Air Transport				
Energy/Utilities				
Steel Manufacturers				
Misc. Manufacturers (appliances, etc.)				
Food/Beverage				
Research/Lab				
Other:				

__ 28. What is your estimation of the market penetration for each sector? Please indicate whether you are estimating the US market or total global market (answer for sectors you feel qualified to comment on).

	Don't Know	Customers using CMS (%)	What percentage of this penetration is U.S. only?
Automotive			
Automotive Suppliers			
Heavy Equipment			
Aerospace			
Electronics			
Air Transport			
Energy/Utilities			
Steel Manufacturers			
Misc. Manufacturers (appliances, etc.)			
Food/Beverage			
Research/Lab			
Other:			

__ 29. Are you doing business under a CMS contract internationally in the following countries/regions? (Select all that apply)

	CMS Revenue (\$)	# of companies	# of facilities
<input type="checkbox"/> a. Canada			
<input type="checkbox"/> b. Mexico			
<input type="checkbox"/> c. Europe			
<input type="checkbox"/> d. Asia			
<input type="checkbox"/> e. South America			
<input type="checkbox"/> f. Other:			

__ 30. How much of your international business is derived from rolling out programs at multi-national companies?

- a. 0-20%
- c. 41-60%
- e. 81-100%
- b. 21-40%
- d. 61-80%
- f. Don't know

___ 31. In which region do you expect the greatest growth in CMS Programs in the next 2 years?

- | | |
|---|---|
| <input type="checkbox"/> a. United States | <input type="checkbox"/> e. Asia |
| <input type="checkbox"/> b. Canada | <input type="checkbox"/> f. South America |
| <input type="checkbox"/> c. Mexico | <input type="checkbox"/> g. Other: |
| <input type="checkbox"/> d. Europe | |

B.3 Product/Market Segmentation

___ 32. What best defines important criteria you believe customers use to select CMS providers:
(Select 3 of the following)

- a. price
- b. company size \$
- c. product – volume & type (provider product/expertise their needs)
- d. service quality
- e. service type
- f. information technology capabilities
- g. experience / qualifications
- h. other:

B.4 CMS Industry Competition/Concentration

___ 33. Who are the **3 major CMS competitors** in the industry segments you participate in?

Industry	Name of Competitors	Industry	Name of Competitors
O a. Automotive	1. 2. 3. 4. Don't know <input type="checkbox"/>	O b. Automotive Suppliers	1. 2. 3. 4. Don't know <input type="checkbox"/>
O c. Heavy Equipment	1. 2. 3. 4. Don't know <input type="checkbox"/>	O d. Aerospace	1. 2. 3. 4. Don't know <input type="checkbox"/>
O e. Electronics	1. 2. 3. 4. Don't know <input type="checkbox"/>	O f. Air Transport	1. 2. 3. 4. Don't know <input type="checkbox"/>
O g. Energy/Utilities	1. 2. 3. 4. Don't know <input type="checkbox"/>	O h. Steel Manufacturers	1. 2. 3. 4. Don't know <input type="checkbox"/>

O i. Misc. Manufacturers (appliances, etc.)	1. 2. 3. 4. Don't know <input type="checkbox"/>	O j. Food/Beverage	1. 2. 3. 4. Don't know <input type="checkbox"/>
O k. Research/Lab	1. 2. 3. 4. Don't know <input type="checkbox"/>	O l. Other:	1. 2. 3. 4. Don't know <input type="checkbox"/>

__ 34. List emerging competitors:

C. INDUSTRY CONDUCT

C.1 Pricing

__ 35. What percentage of the customers who issue RfP's understand/know their total (lifecycle) chemical costs?

- a. 0-20%
- b. 21-40%
- c. 41-60%
- d. 61-80%
- e. 81-100%

__ 36. What kind of price competition have you seen in bidding on new clients in the industry segment(s) you serve?

- a. Commodity pricing – No ability to differentiate through CMS services
- b. Some ability to value price and CMS services
- c. Strong ability to value-price and CMS services

C.2 Capital Investments

__ 37. How is your organization investing to grow your CMS product/service capacity? (*select two*)

- a. New Chemical Product/R&D
- b. Improved Process Technologies
- c. Information management
- d. Training
- e. Corporate support
- f. Warehousing
- g. Staff

__ 38. Where do you realize the most growth in CMS opportunities?

- a. New customers
- b. Existing customers

__ 39. Can you share with us where you see the major growth opportunities for CMS and your company?

D. INDUSTRY PERFORMANCE

D.1 Revenues/Profits

__ 40. How does your business unit track CMS revenues?

- a. services only
- b. services and products (separately)
- c. services and products (combined)

__ 41. What would you estimate your growth rate has been over the past three years?

	2000 to 2001	2001 to 2002	2002 to 2003
Revenues	<input type="checkbox"/> a. 0-5% <input type="checkbox"/> b. 6-10% <input type="checkbox"/> c. 11-20% <input type="checkbox"/> d. 21-30% <input type="checkbox"/> e. over 30% <input type="checkbox"/> f. -10-0% <input type="checkbox"/> g. Revenues dropped by more than 10%	<input type="checkbox"/> a. 0-5% <input type="checkbox"/> b. 6-10% <input type="checkbox"/> c. 11-20% <input type="checkbox"/> d. 21-30% <input type="checkbox"/> e. over 30% <input type="checkbox"/> f. -10-0% <input type="checkbox"/> g. Revenues dropped by more than 10%	<input type="checkbox"/> a. 0-5% <input type="checkbox"/> b. 6-10% <input type="checkbox"/> c. 11-20% <input type="checkbox"/> d. 21-30% <input type="checkbox"/> e. over 30% <input type="checkbox"/> f. -10-0% <input type="checkbox"/> g. Revenues dropped by more than 10%
Profit margins (Net)	<input type="checkbox"/> a. 0-5% <input type="checkbox"/> b. 6-10% <input type="checkbox"/> c. 11-20% <input type="checkbox"/> d. 21-30% <input type="checkbox"/> e. over 30%	<input type="checkbox"/> a. 0-5% <input type="checkbox"/> b. 6-10% <input type="checkbox"/> c. 11-20% <input type="checkbox"/> d. 21-30% <input type="checkbox"/> e. over 30%	<input type="checkbox"/> a. 0-5% <input type="checkbox"/> b. 6-10% <input type="checkbox"/> c. 11-20% <input type="checkbox"/> d. 21-30% <input type="checkbox"/> e. over 30%

__ 42. Give your best estimate of the following financial performance and expected growth of your company's CMS business unit/equivalent:

	2003	Expected Growth in 2004 (%)	Expected Growth in 2004-2006 (%)
O a. Revenues	(\$)		
O b. Profit margins (Net)	(%)		

__ 43. What is your company's major profit driver?

- a. Cost of products/commodities sold
- b. Cost of services sold
- c. Savings/gainshare
- d. Other:

D.2 Customer Savings

__ 44. On average, what do you estimate that your customers' cost savings are through your CMS services each year (not cumulative)? How much of those savings are typically HARD savings (short-term, bottom-line costs) versus SOFT savings (savings the customers realize but does not reduce the cost of the CMS program, e.g., energy, manpower, etc.)

	YR1	YR2	YR3	YR5	YR10
Total hard savings	____% <input type="checkbox"/> Don't Know				
Total soft savings	____% <input type="checkbox"/> Don't Know				

___ 45. How are these savings achieved as a percent of total hard savings:

	1st Year	Over Contract
a. Volume reduction	_____% <input type="checkbox"/> Don't Know	_____% <input type="checkbox"/> Don't Know
b. Chemical Price Reduction	_____% <input type="checkbox"/> Don't Know	_____% <input type="checkbox"/> Don't Know
c. Management Cost Reduction	_____% <input type="checkbox"/> Don't Know	_____% <input type="checkbox"/> Don't Know
d. Manufacturing Process Improvement	_____% <input type="checkbox"/> Don't Know	_____% <input type="checkbox"/> Don't Know
e. Other:	_____% <input type="checkbox"/> Don't Know	_____% <input type="checkbox"/> Don't Know

D.3 Environmental Performance

___ 46. For what percentage of customers do you track and report environmental metrics?

- a. 0-20% c. 41-60% e. 81-100%
 b. 21-40% d. 61-80%

___ 47. What percent of your customers specifically ask for environmental metrics?

- a. 0-20% c. 41-60% e. 81-100%
 b. 21-40% d. 61-80%

___ 48. How do you primarily achieve chemical use reductions for your customers? (*Select two.*)

- a. Better control over purchasing patterns
 b. Improved inventory management
 c. Process efficiencies
 d. Chemical substitution or new chemical formulation
 e. Other: _____

__ 49. How do you commonly achieve emission reductions for your customers? (*Select two.*)

- a. Recycling/reusing chemicals
- b. Reduce the amount of chemical being applied
- c. Other technological process efficiencies
- d. Chemical substitution
- e. Other:

__ 50. As a CMS Provider, how do you track changes in legislation, policy, or regulations as they relate to chemical management? (*Select all that apply.*)

- a. Government-issued reports
- b. Trade magazines
- c. CMS Forum
- d. General media
- e. In-house counsel/professionals
- f. Other:

__ 51. Are you aware of any U.S. or international regulations or policies that may impact (either positively or negatively) the future of CMS?

- a. Yes
- b. No

If yes, please explain:

Do you have any other comments for us?

Final Request:

Please attach a list of your customers. We will not indicate which suppliers serve which customers or the locations of the customers. Simply include the name of the company and the number of facilities you serve. This will help to approximate the market size – an important indicator for both CMS Forum members and the financial community.

Thank you for completing the survey!

Sample CMS Customer Survey**Please return this survey by April 26th, 2004 to:**

Michelle Sargent
Chemical Strategies Partnership/CMS Forum
423 Washington Street, 4th Floor
San Francisco, CA 94111
Fax: (415) 421-3304

Instructions: Please complete the survey as fully as possible. This survey has four sections and 48 questions. All responses are confidential and will be masked by the CMS Forum. We expect this survey should take no longer than one hour to complete. It may be necessary to track down some information, which may require input from your colleagues. *For the purposes of this survey, we consider a "customer" to be one facility, as opposed to an entire company.* If you have any questions, please contact Michelle Sargent at (415) 421-3405 x14 or michelle@chemicalstrategies.org. Thank you for your time!

Name of Company

Person/s completing the survey

Title/Position

Phone Number

Fax Number

Email Address

CMS CUSTOMERS**A. ORGANIZATION PROFILE****A.1 Company Profile**

__ 1. Corporation:

__ 2. Type of Organization (*select all that apply*):

- a. individual facility
- b. multi-facility
- c. regional
- d. national
- e. international

__ 3. Classification (Primary):

- a. Automotive
- b. Automotive Suppliers
- c. Heavy Equipment
- d. Aerospace
- e. Electronics
- f. Air Transport
- g. Energy/Utilities
- h. Steel Manufacturers
- i. Misc. Manufacturers (appliances, etc.)
- j. Food/Beverage
- k. Research/Lab
- l. Other:

__ 4. Size (# of Employees) of total company:

__ 5. Size (# of Employees) of total company:	__ 6. Annual total sales (revenue \$) (product, services, fees, etc.):
<ul style="list-style-type: none"> <input type="checkbox"/> a. 0 – 50 <input type="checkbox"/> b. 51 - 100 <input type="checkbox"/> c. 101 - 500 <input type="checkbox"/> d. 501 – 1,000 <input type="checkbox"/> e. More than 1,001 <input type="checkbox"/> f. More than 10,000 	<ul style="list-style-type: none"> <input type="checkbox"/> a. Less than \$50 million <input type="checkbox"/> b. \$50 million - \$100 million <input type="checkbox"/> c. \$100 - \$200 million <input type="checkbox"/> d. \$200 million- \$500 million <input type="checkbox"/> e. \$500 million – \$1 billion <input type="checkbox"/> f. More than \$1 billion

A.2 CMS Program

__ 6. Division(s) using CMS services?

__ 7. Number of CMS contracts corporate-wide?

__ 8. Number of facilities using CMS services?

The responses for this survey are for the following facilities/contracts:

__ 9. Who is/are your CMS provider(s)?

- O a.
- O b.
- O c.

__ 10. How long have you had your CMS program(s)? _____ years

__ 11. How many of your employees spend 50% or more of their time managing or supporting the CMS contract?

__ 12. What is the length (average if multiple) of your CMS Contract(s)?

a. 1-2 years

c. > 5 years

e. Don't know

b. 2-5 years

d. Open contracts

__ 13. How often do you review/update your CMS provider contract?

__ 14. What type of products do you purchase through your CMS program? (*select all that apply*)

a. Chemicals (direct)

c. Gases

e. Other

b. Chemicals (indirect)

d. Waste services

__ 15. What is your company's annual purchase for all chemical products (in total)? \$

__ 16. What are your company's total annual chemical purchases and services under the CMS program? \$

__ 17. What portion of the total chemicals purchased by your company is included in your CMS program?

a. 0-20%

c. 41-60%

e. 81-100%

b. 21-40%

d. 61-80%

f. Don't know

__ 18. The following is a list of potential CMS services that could be offered within a CMS program. Indicate what range of CMS services is included in your CMS program.

Purchasing: ____% Sourcing (involves engineering component); Procurement (executing buys)

Inventory: ____% Receiving; Inspection (incl. verification); Testing; Labeling; Re-certification; Warehousing

Application: ____% Delivery to point of use; Use (application, change out, tool, or process management)

Value added: ____% Process efficiency improvements; Repackaging; Other fee for service

Data Management: ____% Order tracking; MSDS Management; Customer use tracking; Chemical use (vol.)

Disposal: ____% Waste collection on-site; Waste water treatment plant operation

EHS services: ____% Support for compliance reporting (TRI, air emission reports, manifests, etc.); Emergency preparedness/response

Other: ____%

__ 19. How is (are) your CMS contract(s) designed? (select all that apply)

<input type="checkbox"/> a. Implementation fee <input type="checkbox"/> Volume Driven <input type="checkbox"/> Fixed <input type="checkbox"/> Mixed	_____ %
<input type="checkbox"/> b. Management fee <input type="checkbox"/> Volume Driven <input type="checkbox"/> Fixed <input type="checkbox"/> Mixed	_____ %
<input type="checkbox"/> c. Chemical purchase cost pass-through	_____ %
<input type="checkbox"/> d. Cost per (or fixed price/unit output – “unit pricing”)	_____ %
<input type="checkbox"/> e. Mandated Cost Savings	_____ %
<input type="checkbox"/> f. Incentives for reduction on commodity unit price	_____ %
<input type="checkbox"/> g. Shared cost savings (shared upside)	_____ %
<input type="checkbox"/> h. Environmental performance incentives	_____ %
<input type="checkbox"/> i. Other:	_____ %

__ 20. Has your CMS program been extended or changed since inception?

- a. Yes
- b. No

__ 21. If yes, how? (select all that apply)

- a. Scope change
- b. Compensation mechanism
- c. Terms & conditions
- d. Extension
- e. Information Technology
- f. Other:

__ 22. Would you consider extending the scope and volume of your CMS purchases as follows?

a. Scope increase

- a. Yes
- b. No

Explain:

b. Volume increase

- a. Yes
- b. No

Explain:

B. INDUSTRY STRUCTURE**B.1 Industry Definition**

__ 23. Do you agree with the following definition for “Chemical Management Services”?

A strategic, long-term relationship in which a customer contracts with a service provider to supply the customer's chemicals and to manage related services. Under a CMS contract, the provider's compensation is tied primarily to quantity and quality of services delivered, rather than to chemical volumes sold. CMS goes beyond invoicing and delivering products to optimizing processes, continuously reducing chemical lifecycle costs and risk, and reducing environmental impact.

- a. Yes
- b. No

__ 24. Does your program fit within this definition of CMS?

- a. Yes
- b. No

__ 25. Please indicate how you would change this definition:

B.2 Product/Market Segmentation

__ 26. What were the original 3 major drivers behind your decision to purchase CMS services? (*Select three*)

- a. Lower costs
- b. Lower volume of chemical used
- c. Integrated services (inventory management, delivery, waste disposal, etc.)
- d. Improved process efficiency
- e. Improved environmental performance
- f. Outsourcing / reducing headcount
- g. other:

__ 27. When choosing a CMS provider, what are your 3 most important decision criteria? (*Select three*)

- a. price
- b. company size
- c. product – does provider expertise match your needs?
- d. service quality
- e. information technology platform
- f. experience in your sector
- g. experience/qualification in general
- h. other:

__ 28. In your opinion, what is driving the market for CMS? (*Select all that apply*)

- a. price
- b. regulations
- c. environmental concerns
- d. outsourcing
- e. operational efficiency
- f. other:

B.3 Customer Power

__ 29. Who are the largest 3 companies (market capitalization) in your particular industry segment (include your company if appropriate)?

- a.
- b.
- c.

__ 30. How concentrated is your competitor base (in your industry segment)?

- a. less than 3 competitors account for more than 75% of total chemical purchases
- b. less than 5 “
- c. less than 10 “
- d. less than 20 “

__ 31. In your estimation, what percentage of companies in your market has implemented CMS programs?

- a. 0-20%
- b. 21-40%
- c. 41-60%
- d. 61-80%
- e. 81-100%
- f. Don't know

__ 32. Who are the major CMS providers that bid on your RfP or are capable of providing CMS related chemicals and services to your industry?

Name of CMS Providers:

- a.
- b.
- c.
- d.

__ 33. How concentrated is the CMS provider base in your industry segment?

- a. less than 3 providers able to provide level of CMS services I need
- b. less than 5 “
- c. less than 10 “

B.4 Information Technology

__ 34. Does your CMS provider have the capability to allow chemical purchases via the Web?

- a. Yes
 b. No

__ 35. Does your CMS provider have the capability to provide Material Safety Data Sheets (MSDSs) via the Web?

- a. Yes
 b. No

__ 36. How important were the IT capabilities of the CMS provider in your selection process?

- a. Critical b. Very Important c. Important d. Not a key factor

C. INDUSTRY CONDUCT**C.1 Pricing**

__ 37. To what extent do you understand/know your total (lifecycle) chemical costs?

- a. Not at all b. Fair c. Well d. Very well

__ 38. Which description most closely fits your CMS program?

- a. Pricing is always based on chemical volume.
 b. The chemical service elements of the contract adds value, and the quality of these services affect pricing to some degree.
 c. Significant value is created through the CMS service model, and pricing is set to allow both partners to share in the benefits.

C.2 Channel Strategies

__ 39. In your company, who led the development of your CMS initiative and selection of a CMS provider?
(Select all that apply)

- a. CEO/CFO
 b. Business Unit Purchasing
 c. Corporate Purchasing
 d. Financial managers
 e. Plant Manager
 f. EH&S department
 g. Other

D. PERFORMANCE

D.1 Benefits

__ 40. Does your company have a system for tracking and measuring your CMS program performance?

- a. Yes
- b. No

__ 41. If yes, what metrics do you track / measure? (Select all that apply)

- a. Cost reduction
- b. On-time delivery (schedule, etc.)
- c. Quality
- d. Services
- e. Material use reduction
- f. Emissions reduction
- g. Other:

__ 42. What are major benefits realized by your program? (Select all that apply)

- a. Reduced chemical purchase costs
- b. Reduced chemical use
- c. Reduced waste / scrap costs
- d. Reduced labor costs
- e. Reduced overhead/ fixed costs
- f. Improved inventory management
- g. Improved delivery
- h. Improved data management
- i. Decreased process downtime/extended tool life

D.2 Savings

__ 43. Please indicate the financial savings you have realized through your CMS program?
(annually, not cumulative)

	YR1	YR2	YR3	YR5	YR7
Total net savings	____%	____%	____%	____%	____%
	<input type="checkbox"/> Don't Know				

__ 44. On average, where are these savings realized as a percent of total savings:

	1st Year	Over Contract
a. Volume reduction	____% <input type="checkbox"/> Don't Know	____% <input type="checkbox"/> Don't Know
b. Chemical Price Reduction	____% <input type="checkbox"/> Don't Know	____% <input type="checkbox"/> Don't Know
c. Management Cost Reduction	____% <input type="checkbox"/> Don't Know	____% <input type="checkbox"/> Don't Know
d. Manufacturing Process Improvement	____% <input type="checkbox"/> Don't Know	____% <input type="checkbox"/> Don't Know
e. Other:	____% <input type="checkbox"/> Don't Know	____% <input type="checkbox"/> Don't Know

D.3 Environmental Performance

__ 45. How do you most commonly achieve chemical use reductions? (*Select two.*)

- a. Better control over purchasing patterns
- b. Improved inventory management
- c. Process efficiencies
- d. Chemical substitution or new chemical formulation
- e. Other:

__ 46. How do you commonly achieve emission reductions? (*Select two.*)

- a. Recycling/reusing chemicals
- b. Reduce the amount of chemical being applied
- c. Other technological process efficiencies
- d. Chemical substitution
- e. Other:

__ 47. As a CMS Customer, how do you track changes in legislation, policy, or regulations as they relate to chemical management? (*Select all that apply.*)

- a. Government-issued reports
- b. Trade magazines
- c. CMS Forum
- d. General media
- e. In-house counsel/professionals
- f. Other:

__ 48. Are you aware of any U.S. or international regulations or policies that may impact (either positively or negatively) the future of CMS?

- a. Yes
- b. No

If yes, please explain:

Do you have any other comments for us?

Final Request:

Please attach a list of your all the facilities in your company that have a CMS program. This will help to approximate the market size – an important indicator for both CMS Forum members and the financial community.

Thank you for completing the survey!

Appendix B: Definition of Contract Mechanisms

Compensation Mechanism	Description
Implementation Fee	This is a one-time fee charged to cover start-up costs of the program. It may be an up-front fee or can be amortized over the life of the contract.
Management Fee	This fee is typically meant to pay for the cost (or value) of the services provided. There are several types of management fees: <ul style="list-style-type: none"> • Fixed fee (e.g., \$5,000 per month); • Variable fee (e.g., \$50 per labor hour expended); • Volume-driven (e.g., 18% of chemical purchase costs); or • A combination (e.g., \$3,000 per month plus \$20 per labor hour expended). For variable and volume-driven, sliding scales can be used (e.g., 18% for the first \$1,000,000 of chemical purchases, 12% for the next \$250,000, 8% for the next \$250,000, etc.).
Shared Cost Savings/ Gainsharing	The cost savings a customer can anticipate are broadly classified as non-material savings and management savings. These can be shared with the provider as part or all of the compensation. This feature is usually used in combination with another compensation mechanism.
Chemical Purchase Cost Pass-Through	The provider passes through the actual cost of the chemicals to the customer. This mechanism is coupled with another mechanism to compensate the provider for accompanying services.
Mandated Cost Reduction	The provider agrees to reduce the total cost of the contract by a certain percentage each year.
Incentives for Reduction on Commodity Unit Price	A portion of the savings or other financial reward is given to the provider for reducing the unit cost of chemicals purchased or the “last price paid” for chemicals by the customer.
Environmental Performance Incentives	A financial or other reward for achieving specific goals for environmental performance set by the customer (e.g. reducing emissions, reducing chemical use, reducing hazardous waste).
Unit Price	A set price per finished product is paid for all chemicals and services. (e.g., \$20 for each printed circuit board)

Source: Chemical Strategies Partnership, *Tools for Optimizing Chemical Management*, section 6.5.

Appendix C: Estimated CMS Industry Potential Market

This section describes the methodology for estimating the current, potential market for chemical management services. The methodology is based on a similar approach used by Professors Tom Bierma and Frank Waterstraat of Illinois State University.³⁷

CMS Revenue: definition

A conservative approach to revenue estimation suggests that CMS is unlikely to be adopted by a potential customer unless it is at least cost-neutral on a chemical purchase basis. (That is, that the total cost of chemicals and related services purchased under a new CMS contract should not exceed the annual costs paid by a customer for all chemicals.) However, more recently, in discussions with CMS providers and customers, CSP has seen the emergence of management fees in addition to chemical purchase costs as a common approach. The management fees often amount to between 10-15% of the chemical spend. The management fees also include gainsharing revenue that results from savings delivered to a customer that are shared by the customer and supplier. Thus CMS revenue has two components: chemical purchases and management fees.

Size of the Potential CMS Market

CSP estimates the size of the CMS market in four steps:

1. The current U.S. specialty chemical market
2. The proportion of the specialty market that is amenable to CMS
3. The proportion of chemical sales amenable to large-volume customers
4. Add in revenue from management fees

The current U.S. specialty chemical market

CMS programs can include a wide variety of industrial chemicals, but specialty chemicals have been the major driver behind most CMS programs. Specialty chemicals have relatively high margins and a higher level of expertise is generally required to optimize the use of such chemicals. Therefore, we use the specialty chemical market as an estimate for the potential CMS market. In 2003, the U.S. Specialty Chemical Market was \$115 billion.³⁸

The proportion of the specialty market that is amenable to CMS

Several classes of specialty chemicals are not amenable to inclusion in a CMS program. Generally, “direct chemicals”, chemicals that are embodied in the end product, are managed closely by manufacturers. These direct chemicals constitute part of their core business and manufacturers are less likely to engage an outside provider to assist in managing those chemicals. Where we see CMS programs most successful is in managing “indirect chemicals” such as lubricants, solvents, wastewater treatment chemicals, and other MRO chemicals. Approximately 55% of specialty chemicals are not amenable to CMS, such as bulk medicinal chemicals, pesticides, specialty polymers, flavors and fragrances, and specialty ceramics because they fall into the category of direct chemicals.³⁹ Thus, we reduce the initial \$115 billion Specialty chemical market amenable to CMS to \$52 billion.

³⁷ Bierma, Thomas J; Waterstraat, Frank L, “Chemical Management: Overcoming Barriers to Diffusion”, Champaign, IL : Illinois Waste Management and Research Center Reports, Appendix 1, 2001.

³⁸ *Chemical Week*, January 7/14, 2004, p.19. *Chemical Week* specialty chemical market includes: coatings, fine chemicals, adhesives and sealants, plastic compounds, I&I cleaners, food additives, plastic additives, flavors and fragrances, water treatment chemicals, catalysts, oilfield chemicals, lube additives, cosmetic additives, paper additives, rubber chemicals, other.

³⁹ Bierma, Thomas J; Waterstraat, Frank L. “Chemical Management: Overcoming Barriers to Diffusion”, Champaign, IL: Illinois Waste Management and Research Center, Appendix 1, 2001.

The proportion of chemical sales amenable to large-volume customers

A CMS Provider rule-of-thumb for “full-service” CMS—that is, CMS programs in which at least one full-time employee of the CMS provider is on-site—is \$1 million in annual chemical buy. Across all manufacturing sectors, Bierma and Waterstraat estimate that about one-third of specialty chemicals are sold to accounts satisfying this criteria. “Full service” CMS is not the only conceivable CMS model. However, a number of CMS providers identified delivering value-added services to smaller facilities as a major and unresolved challenge. Eliminating smaller facilities (those with less than \$1 million in annual spend) is thus appropriate in constructing a conservative estimate of the potential CMS market. If we reduce the \$52 billion market by two-thirds to account for the smaller customers, we arrive at a potential CMS market of \$17 billion.

Add in revenue from management fees

According to CMS providers surveyed, many compensation arrangements involve a management fee in addition to the amount of chemicals sold. The management fees often amount to between 10-15% of the chemical spend. If we add the additional revenue to the \$17 billion in chemical spend, we adjust the market size up to \$19.5 billion.



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