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IT Services Market Analysis

By

Linnette Perales Rivera

Project submitted in partial fulfillment of the requirements for the
degree of Master of Science in Information Technology

Rochester Institute of Technology

**B. Thomas Golisano College
of
Computing and Information Sciences**

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Master of Science in Information Technology

IT Services Market Analysis

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I. Abstract

The IT services market represents an attractive set of markets with potential for profit. As technology matures, firms now see and accept the benefits that these technologies bring to their existing business environments. With the wide possibilities within the IT services field, service providers must now evaluate the market they desire to participate in. I have analyzed aspects such as potential market demand and entry barriers to gain a basic understanding of the competitive outlook for knowledge management, systems integration and web services. I also used concentration ratio data to calibrate and understand the level of competition experienced within these fields. Key findings include an overall low impact from regulatory and capital requirements to enter these markets. Paired with a high level of fragmentation, these IT markets have great potential to benefit from the forecasted growth and establish profitable businesses.

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III. Introduction

Today, the Internet is used for more than just online storefronts: internet-based applications are used to input, process, store, and extract information often using enterprise-wide applications. Whether independent or linked to outside entities, Internet applications serve as information vehicles with functionality that ranges from transforming information to facilitating transactions. As these applications reduce time in existing business processes, managers see the value in freeing resources to focus on other elements of the business that will make them more competitive.

The demand for tools that drive efficiencies within firms has led to an increased interest in the information technology services market. As key technologies have matured, new business functions have been enabled and incorporated into the wide range of applications this field offers. Businesses now recognize the potential of internet-based technology to lean their current processes, which provides competitive advantages. Strategists see the potential for these applications to increase the speed of their business processes and scale up the range of their product services. Tapping into the right IT market segment poses significant revenue opportunities for those able to meet those business needs.

The objective of this project is to provide an analysis of key IT services markets to understand the opportunities and challenges for those that decide to enter these markets. Market demand is investigated for markets related to knowledge management such as content management, data storage and collaboration tools. Systems integration and web services are also investigated for market size and ease of entry into these markets. Lastly, market demand and entry barriers are compared to industry concentration data from the U.S. economic census to provide a relative sense for the level of competition and calibrate the sometimes-optimistic outlooks from the market demand curves.

IV. Understanding the IT Services Marketplace

The IT services marketplace is a very diverse market environment. It covers a variety of technologies ranging from the creation and processing of data to its communication and transfer, whether it is through mobile or hardwired devices, from point-to-point or through the use of the World Wide Web. The IT field includes both the hardware and software aspects of all the technologies. To succeed in a field so vast, a firm needs to plan for what segments of the IT services market it will pursue as their source of revenue. Evaluating which segments to enter in the marketplace represents a key step in formulating the marketing plan.

A marketing plan forms a crucial element on any business' project. It provides the information required to further define their business scope and refine their goals. Specifically, the research behind a marketing plan provides the information to determine customer needs, understand competitive advantages, and select specific market segments to pursue as part of the business strategy. There are three basic elements to defining a marketing plan:¹

- Market research – identify customer needs, market size and entry barriers
- Market strategy – identify and formulate competitive advantage plans
- Target market plan – identify specific markets of interest to the business

Through market research, the trends that impact revenue and profitability may be detected timely. Characteristics such as technology breakthroughs, economic slowdown or legal barriers are also uncovered through this type of research.

This project will focus on two aspects of the market research element of the marketing plan for IT services: market size and entry barriers.

A. Assessing the state of the market

1. Market demand and its value

Market demand or potential is defined as “the total volume of a given product or service bought by a specific group of customers in a specified market area, during a specific time period.”² A market demand analysis provides the understanding of the direction the market place is moving towards. Successful firms are involved in long-term strategic planning, which involves forecasting. Forecasting, in turn, is an “estimated actual dollar or unit sales of a product category for all firms (including your own) within the defined area and period of time.”³ In other words:

“Market potential refers to the amount that could be sold; the market forecast establishes what should be sold.”⁴

Market potential or demand curves are influenced by changes in income, the distribution of income (demographics) and firm size, changes in consumer preferences, and changes in both the current and the

expected price of goods. Demand curves bring value to a firm by helping the business set measurable objectives against the maximum market capability for a particular good, which enables the business to have quantifiable outputs to their execution efforts. It constitutes one of the cornerstones of the marketing plan.

Market demand or potential represents a predicted market demand curve or the sum of the demand of all individual consumers. It takes into account the fact that consumers may value any particular good higher than the price it is paid for it – this known as consumer surplus. Consumer surplus impacts the market potential analysis by establishing a minimum revenue or potential to be gained from an average price. This average price may not include any gains from those higher priced goods that consumers valued highly enough to pay for the above-average price (surplus gains concept).

Market demand is influenced by consumer behavior. There are five principles behind consumer's choice: ⁵

- Changes in income
- Consumer decision patterns and its uncertainties
- Income distribution
- Substitution (one good or service may be replaced by other similar one)
- The law of diminishing marginal utility (DMU): as consumption of a good increases, the marginal utility (or satisfaction) of each additional unit decreases.

In market processes, there are two basic laws underlining the economical events within a market. These economical principles act from both the consumer's side and from the producer's (the firm's) side. In the process of building a market demand curve, the analysts consider the concepts of supply and demand, which represent the level of scarcity of products and the consumer's choice. Primarily, it is these two laws what shapes a market potential curve.

Despite all its benefits, estimating market potential has intricacies to be considered as part of the analysis. These issues include the mechanics of formulating the estimates such as the equation used for modeling the predictions, the accuracy of the predictions and their margin of error, and lastly the consequences of those errors measured in profit units. The first two form an integral part of the estimation of the market size. The conversion of the error in profit units represents part of the analysis the business would carry out using the market potential data.

For the purpose of this project, the margin of error for the data presented is stated as part of the assumptions behind each market data report. These assumptions can be translated as quantifiable business risks depending on the firm using the data. The demand analyses used in this project are authored by subject matter experts in the field of market analysis. Primarily three market analysis firms were used for this analysis: IDC, Gartner and Forrester Research. Each of these firms has made the hypotheses and clarifications regarding the assumptions dictating the risks of the predicted market data.

2. Market Entry barriers and its value/meaning

Entry barriers are defined as factors that “limit competition by preventing market entry of new firms.” In addition, these barriers may also “increase the profits of incumbent firms in the marketplace.”⁶ Entry barriers constitute one of the five forces in Porter’s Five Forces analysis of rivalry and competition, along with supplier and buyer power, threat of substitutes and degree of rivalry.⁷ Examples of entry barriers include absolute cost advantages, economies of scale, capital requirements, government policies, product differentiation, switching costs, firm concentration, and access to distribution among others. These factors represent barriers as they discourage new market entrants from entering a particular market. Other factors, although not in the form of barriers, actually encourage market entrance. Market size growth is an example of a factor that would affect market entry by increasing the rate of entrants through the encouragement of the market growth information.

The value of an entry barriers analysis lies on the categorization of the forces exerted in entering a new market. Through the knowledge of the types of forces, the business can then analyze the risks affecting the success of the firm and generate potential countermeasures to reduce the damage of those risks that do occur.

3. Other tools available to assess the market

Market potential and entry barriers provide a great extent of insight into aspects unique to the Information Technology (IT) field. From a firm’s point of view, a market that is too volatile may represent a risk or an opportunity, depending on their business goals. This was the case of the “Dot-bomb” phenomena during the late 90’s. Given this scenario for the IT services market, the tools chosen for this thesis bring relevance by:

- Establishing early indicators of exaggerated growth expectations as well as expected market substitutions or decline – Market potential analysis
- Unveiling market conditions that favor (or disfavor) a firm entering a particular market that may yield either extremes of fierce competition or market saturation – Entry barriers

However, there are many other tools designed to aid firms with the task of market analysis. This project will discuss the area of market research. Two tools will be used for this purpose: estimation of the market potential and categorization of the market entry barriers. Many other tools exist for the analysis of a market’s health. Competitor, customer, and market pricing analyses are some examples of other techniques available to understand the marketplace.

V. IT Services Market Demand

In the IT industry, as with all other markets, events such as economic recessions, war, or environmental conditions have an impact in the predicted demand curves. Events such as the “dot-bomb” in the late 90’s have had a profound impact on the assumptions behind these predictions. These assumptions are referenced to provide perspective to the data presented.

The market data presented comes from two main sources of information, based on the analysts cited. The first tier of information, the primary sources, includes surveys from IT services vendors, surveys with customers (purchase and spending plans), and interviews with the suppliers of the particular sector. The secondary sources of data include Dun & Bradstreet data, Government census data, news articles, and public financial records. The information gathered through these sources is then analyzed to formulate the market forecasts. Specifics on the models used to generate these demand estimates are not provided as they are considered proprietary by the analysts.

A. Knowledge Management

Knowledge management (KM) serves organizations by managing processes and data for users to generate information and business decisions. The main objective of KM applications in any organization is to increase productivity and minimize resource waste. Thus, knowledge management may be defined as “user-centered processes that enable exploring data, data relationships and trends, thereby improving the overall decision making.”⁸

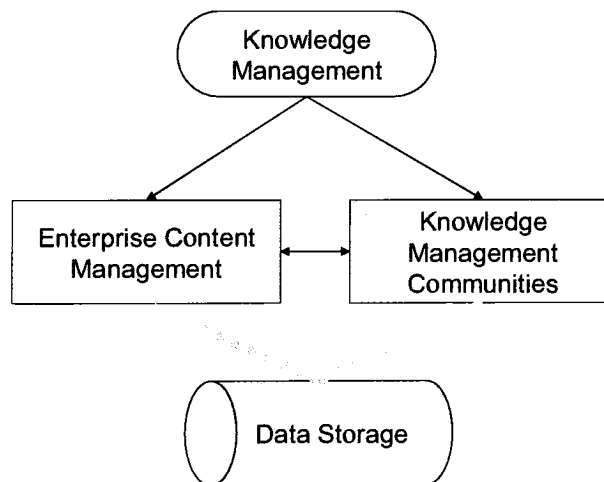


Figure V-1. Relationship between Knowledge Management and its sub-markets.

Knowledge management practices hold three basic areas to its infrastructure: unstructured data, structured data, and collaboration and messaging. Unstructured data encompasses mostly document and content management, whereas structured data entails the data generation, warehousing and management. The groupware required for users to communicate and share information lies within the collaboration and messaging category.⁹

Despite the obvious benefits, however, few suppliers have turned KM into a profitable business.¹⁰ This is primarily due to the challenges involved in changing an organization's work habit and the expensive investments in data conversion and management systems necessary— thus the challenge in selling the applications and turning KM into a successful business niche. Nevertheless, companies who have successfully implemented KM programs have one common denominator: a solid incentive program that fosters employees to embrace the new methods and culture. Like with other technology investments, “installing the system is just the first step; persuading employees to adopt it is the real challenge.”¹¹

Despite these challenges, the vendors that do provide KM-related services experienced a strong KM product deployment related to content and collaboration tools, as indicated through customer surveys. Survey results indicate customers invested heavily on KM initiatives during 2003 and 2004. Results show approximately 52% of the firms invested in web content management and other 50% on real-time collaboration initiatives.*¹² This is largely due to increasing enterprise initiatives for boosting competitive advantage through waste-reduction and cost-efficiency initiatives.

The following sections cover the data analysis of three sub-markets associated with knowledge management: content and document management (unstructured data management), data management and warehousing (structured data management), and knowledge management communities.

1. Knowledge Management Communities

The KM communities are defined as “a group of people with shared objectives, interests, purposes that interact and build relationships with each other in an online environment across time and space. The community captures knowledge in the form of content, people and processes.”¹³

Knowledge management communities develop around three basic elements: content, people and processes. The media through which information is accessed caters for the querying of both structured and unstructured data. Structured data may be presented in the form of databases or datum files, while unstructured data may be represented by email threads recording the actions taken.

The knowledge management communities market covers those tools and processes supporting portal environments that promote user collaboration. Collaboration applications enable knowledge management communities to exist. Collaborative requirements management tools and tools supporting workflow and product design are examples of collaboration applications within the scope of this market analysis.¹⁴

a) Market analysis assumptions

Assumptions specific to this market include:¹⁵

- Weak global and U.S. economic conditions
- In general, KM communities start as pilot programs and expand over time

* Respondents had the option of choosing multiple initiatives.

b) Worldwide market demand

Figure V-2 shows the worldwide market size for the KM communities market. This field has fast growth rate, estimated at a 23% compounded annual growth rate (CAGR) over the 6-year period.* † The market size data represents the potential revenue from consulting, implementation, operations, training and maintenance bundle of services.

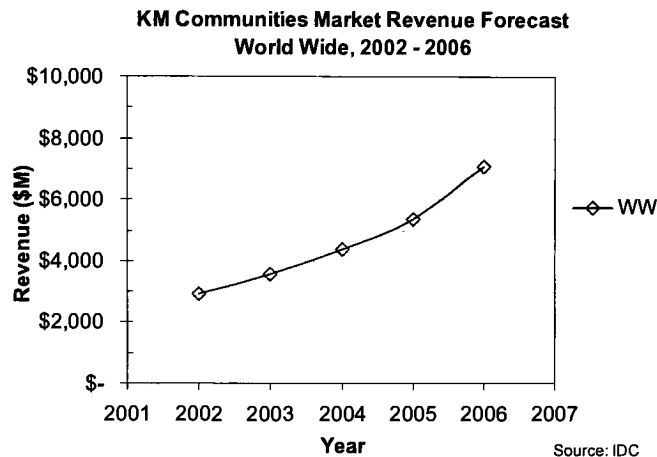


Figure V-2. KM Communities – Worldwide market size in millions \$.¹⁶

2. Data Storage

Data management represents the backbone of knowledge management practices. Data storage provides for the management of structured data forms. Structured data includes any form of organized records in the conventional database structure, whether data is numeric, text, or a combination of both. Within the KM infrastructure, data management feeds the creation of content and information, thus rendering it as the backbone of knowledge itself.

For purposes of this analysis, data storage is defined as a “process that organizes time-based data coming from multiple applications according to the subjects meaningful to the business and by the need to inform decision makers.”¹⁷

The data storage market data includes storage applications through a wide range of services. These services include general hardware and software maintenance and support services. Storage consulting, implementation, training and management services (as required for the product sold) also form part of the scope of the data analysis. Appendix III provides the details on the scope of each of the service subcategories mentioned.

* CAGR definition as used in the analyses available in Appendix I.

† Data source assumptions and raw data available in Appendix II.

a) North America market demand

Data storage predictions have a slow but solid growth over the predicted 5-year period. The compounded annual growth rate prediction of 7.1% encompasses the slowdown experienced due to the weakened economy. The IT spending bubble, still present by the end of 2000, breaks and becomes palpable through a lower spending on storage services during 2001 and through 2002. Predictions show steady, but slow, growth at 7.2% CAGR through 2006 for North America (Figure V-3). Faster growth is predicted for the European Union at 36% CAGR through 2008.

Hand in hand with data storage services is the storage outsourcing market. The storage outsourcing market has sprung out of the fact that the data storage market has a standard set of products and many vendors to choose from, primarily competing in price (commoditization). With storage hardware undergoing commoditization, storage vendors are leveraging outsourcing services as means to recover the lost margins. Figure V-4 holds the data for storage outsourcing through 2006. By comparison, the outsourced versus in-house data storage services shows faster growth at 33% CAGR: there is a new trend of customers that prefer not to manage the storage processes but rather pay per use.

b) Market analysis assumptions

In the U.S. the decline in storage hardware prices due to commoditization impacts these demand curves. In addition, the Sept-11 incident has driven some storage demand for business resumption purposes. A continued worldwide economic slump also impacts IT spending related to all services types.

For the European Union, new governmental legislations require a six-year storage of business emails and enhanced defenses against cyber crime. The market demand data was converted to Euro using a factor of 1 Euro = 1.22560 US Dollars. Other assumptions include a B2B trade expected to grow from 1%/2001 to 22%/2006.¹⁸

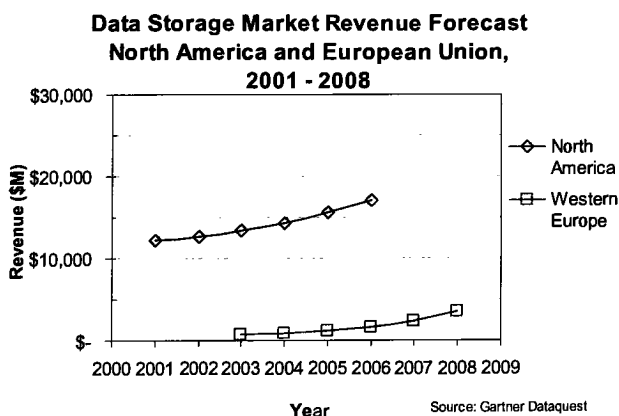


Figure V-3. Data Storage services – North America and European Union market size in millions \$; Includes Canada and U.S. populations.¹⁹

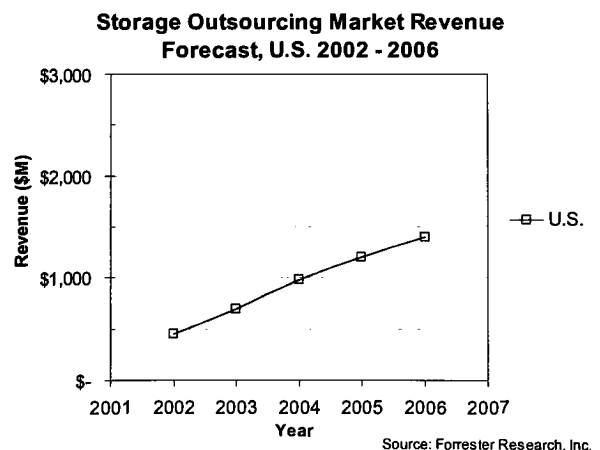


Figure V-4. Storage Outsourcing – U.S. market revenue size.^{20 21}

Market growth trends indicate that data storage demand is still a priority amongst corporate executives. Survey results validate the demand for both in-house and outsourced storage, as shown in Figure V-5.

Despite this solid trend for storage services, more than 10% of the firms outsource as much as 80% of their storage needs.²² The distribution in the responses supports the possibility for growth of the storage-outsourcing sector, particularly when considering business-resumption storage applications as part of the data storage outsourcing services.

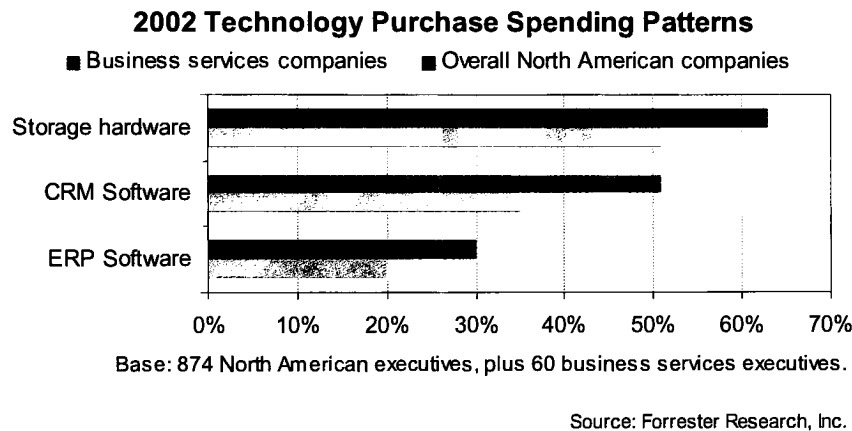


Figure V-5. Technology purchase considerations from surveyed North American corporations and business services firms.²³

Figure V-5 validates the optimistic growth trends for both bought and outsourced data storage systems. A considerable 63% of a large, surveyed population indicated data storage is a priority versus ERP and CRM applications. This is largely – as it is logical – due to the awareness of competitive advantage from stratified data mining and necessity of storage for most any knowledge management or customer requirement application on the enterprise.

3. Enterprise Content Management

Enterprise content management (ECM) services are formalized services that help clients achieve effective management of data and information. It includes planning, design, implementation, operations, training, and support activities. These can be provided as standalone services or as part of a range of content management services. Content management entails three basic primary functions:²⁴

- **Content Creation.** Content providers feed the correct type of data required to appropriately categorize the information, its final location and publishing formats. It also has procedures to notify others of new or changed content.
- **Content Review and Approval.** A dedicated resource (manual or automated) dedicated to check content for accuracy and redundancy before its addition to the system.

- **Version Control.** A recovery process that enables the ability to track changes and replenish lost content.

Overall, ECM applications build, organize, manage, store, make accessible, create access to, or deliver information in a variety of media formats. Authoring tools or tools designed to handle single documents, such as Internet fax delivery systems, are excluded. Also excluded is revenue from management SW or from business process outsourcing for document management.²⁵

a) Market analysis assumptions

The state of the economy will impact the formation of new projects, which will focus primarily on cost reduction, customer satisfaction, revenue growth, and improving competitive performance. Industry-specific regulations will drive demand in order to fulfill necessary requirements for compliance with electronic record keeping processes required by new government regulations. Lastly, some of the demand is influenced by specific industry sectors, in this case, the financial services, government, healthcare and pharmaceutical industries.²⁶

b) Market demand

The ECM market is expected to reach \$4.5B in U.S. and \$7.4B World Wide (WW) in 2007. Growth rate is predicted at 12.1% and 12.3% CAGR for U.S. and WW, respectively. An average of 61% of the World Wide revenue from this market will come from the U.S. alone.

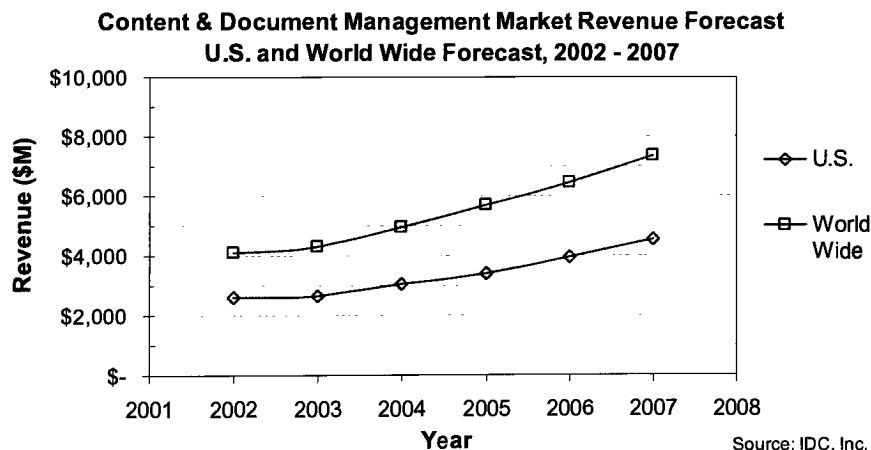


Figure V-6. Market revenue for Enterprise Content Management, U.S. and World Wide.^{27, 28}

Predicted revenue opportunity for the U.S. market appears reasonable given the powerful drive from the Government Paperwork Elimination Act (GPEA), enacted in 1998, which requires government agencies to use and accept electronic signatures and maintain, submit or disclose electronic information, when practicable as a substitute for paper.²⁹

Another powerful driver to the growth of ECM lies on cost downs through the reduction of workforce. With fewer resources, companies are apt to consider alternate methods of managing content and documentation in general. Businesses rely on diminished personnel to manage large amounts of complex information, while generating new content with increasingly sophisticated formats.

B. Web Services

Web services originated, as it became a more effective means to connect with business partners. Current B2B technology fails to fulfill the entire requirement spectrum, and global companies face a complex web of customers, resellers, and suppliers. Great amounts are spent on supply chain, e-procurement, and CRM applications to connect with business partners with elusive benefits mainly due to:³⁰

- Integration is expensive. Collaborative applications are far from plug-and-play.
- Inflexible to operate. Flexibility to integrate applications still requires integration by hand despite vendor promises.
- Difficult to extend. Collaborative applications fail to support multi-company collaboration beyond the first level of their distribution channel.

The underlying rationale for web services lies on the availability of cheaper and more flexible connections. Nevertheless, as the complexity of the applications increases, the web services field will require consistent product categorization to handle both new applications and re-engineering of the old platforms.

Overall, web services will enable different pieces of software, regardless of proprietary constraints, to work together to bridge differences between business applications and unlock data to better serve customers.³¹

a) Scope and definition

Web services professional services is defined as the consulting, operation management, support, and training services with the development, deployment and management of Web Services Architecture (WSA) - related initiatives. These may involve the development of new applications, the integration of two or more applications, the development of Web services solutions related to specific business processes, and the ongoing support and management of WSA, applications, or processes.³²

It is also defined as modular, reusable business processes delivered over the Web and consumed by business people via applications, or commonly used business processes delivered over the Web, based on industry-wide standards.³³

Bottom line, web services is simply software designed to be used by other software via Internet protocols and formats.³⁴

b) Market analysis assumptions

The main drivers of the market are the need to optimize current environments rather than implementing new systems and the need for non-proprietary, less expensive means to optimize these environments. In addition, some demand is due to security related solutions, fueled by the US government's Homeland Security initiatives, which will result in the development of new web-services-based middleware solutions.

c) Market data

The web services market shows promising growth. Figure IV-3 shows the market revenue data for the U.S. and Western Europe markets.* Compounded annual growth rate (CAGR) until 2007 estimated at 94% for U.S. and 135% for Western Europe markets. Further studies show U.S. market may grow out to \$184,000M by 2014.

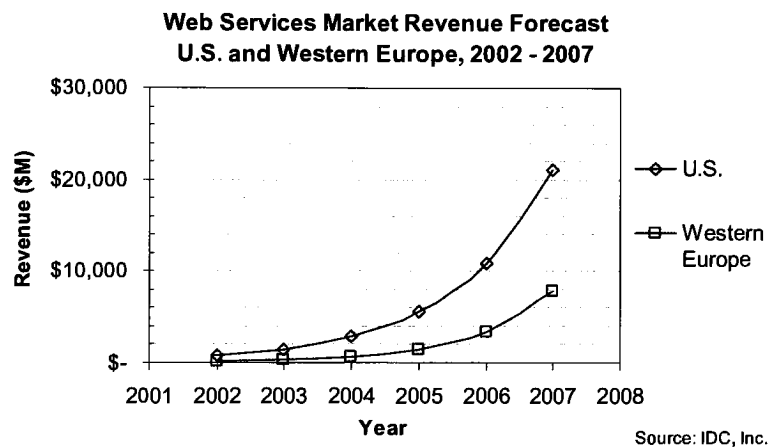
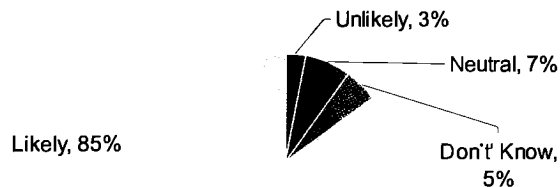


Figure V-7. Market revenue size for Web Services, Western Europe and U.S. ^{35,36}

The following figures represent the voice of surveyed customers (or customers to be) for the web services field. Figure IV-4 shows the distribution of customers considering web services projects within their firms. An astounding 85% of the respondents indicated positive involvement on web-services related projects.

Likelihood of Adopting Web Services in 2003



Base: 75 IT executives at North American companies. Forrester Research, Inc.

* Data from 2003-2006 estimated based on 2002 and 2007 data points and the provided CAGR for the elapsed years. Estimated both W. Europe and U.S.

Figure V-8. Survey Results – Adopting web services in 2003.³⁷

Figures IV-5 and IV-6 contain information on current usage patterns and applications for web services. The figures contain the results of a surveyed population of respondents with positions within IT departments.* About 66% of the respondents indicated current involvement with web services projects. An additional 26% of the respondents plan to engage on web services for projects on 2004. Overall, about 50% of the surveyed population plans to apply web services for processes internal to their business to integrate applications.

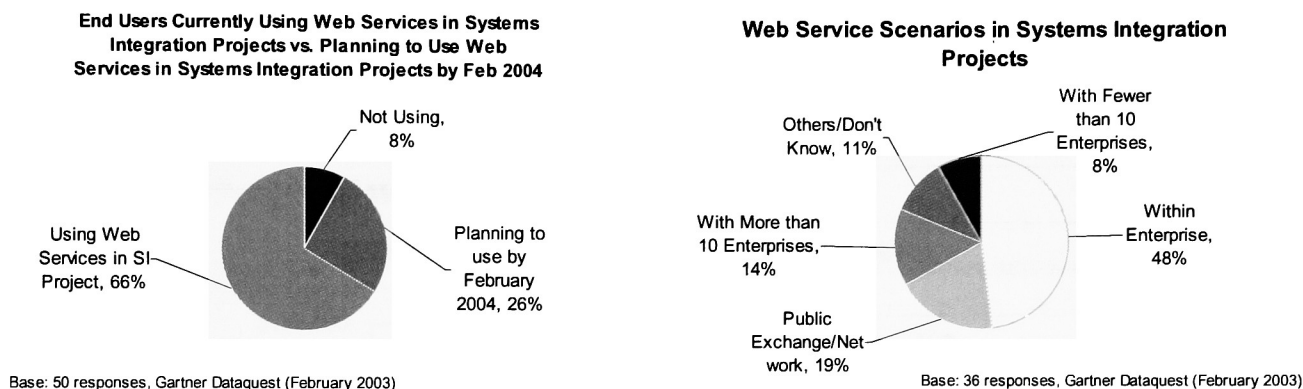


Figure V-9 and Figure V-10. Survey Results – Usage trends and applications of Web Services.³⁸

Web services promises the flexibility and versatility required to manage intra- and inter-enterprise applications. With the economy still weak, the focus of corporations is to improve upon current investments to drive efficiency and reduce costs. Survey results help validate the projected growth: more than 90% of the population is either involved or plans to engage on web services projects (Figure V-9). This market will experience intense growth given the potential of the web services technology to replace other system integration approaches.

Growth in other IT markets, such as Enterprise Content Management, also supports the growth of web services, since organizations must be able to link different repositories and share their content as part of integration initiatives.

C. Systems Integration

Systems integration projects are defined as “development and integration services that customize or develop IT solutions, assets, and processes and then integrate these solutions, assets, and processes with other existing infrastructure and processes.”³⁹

* Demographics on Appendix VI.

Systems integration includes the “planning design, implementation, and project management of a solution that addresses a customer's specific technical or business needs.”⁴⁰ It involves systems and custom application development as well as implementation and integration of enterprise packaged SW. Systems integration also typically involves integrating different platforms and technologies.⁴¹

a) Market analysis assumptions

Market size estimates are mainly impacted by slow economic growth, which in turn causes a general reluctance to make IT investments that do not immediately pay off in higher returns. There is a moderate impact from the state of technology developments in this field: with no new “killer” applications to drive new spending on services, growth will occur mostly on markets supporting the simplification of current technical environments.⁴²

b) World Wide and U.S. Market Data

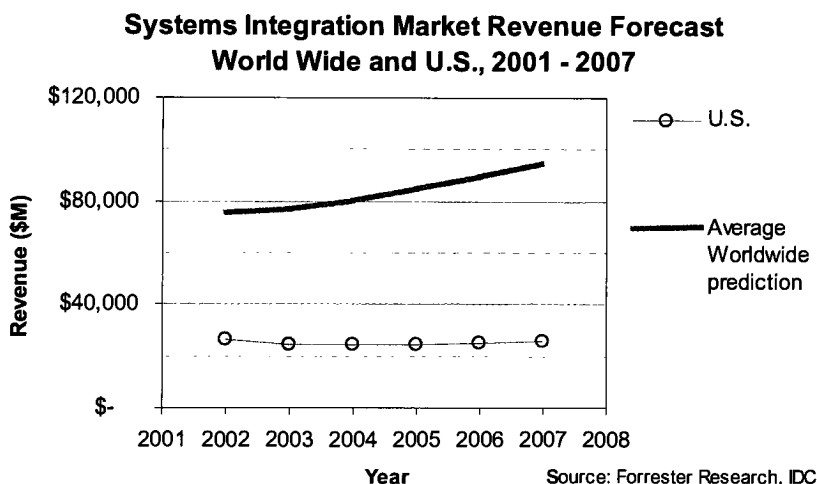
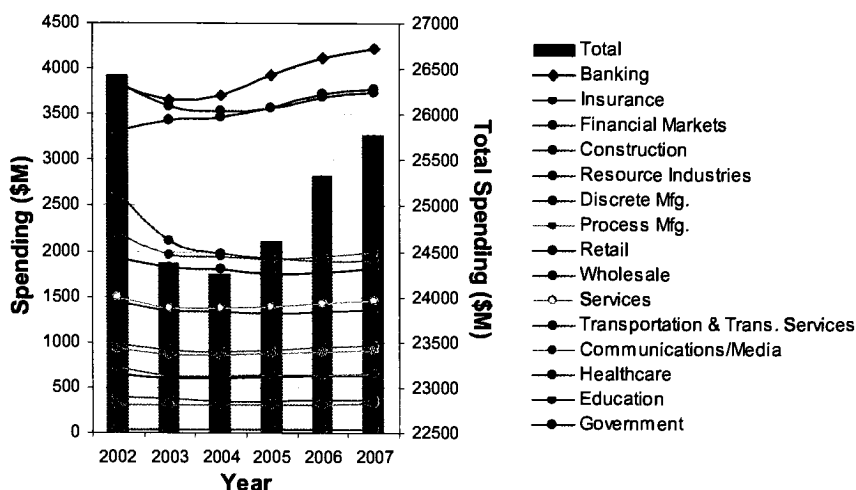


Figure V-11. Systems Integration – World Wide and U.S. market size in millions \$.^{43, 44}

Despite the increase in WW market demand, in the US the projected spending by industry is declining for this market. This may be the product of partial substitution taking place by web services projects. Driven by the potential of standardized, lower cost solutions, system integration’s market substitution is already apparent in the U.S. market. Figure V-12 shows the decline from 2002 through 2005 for most of the industry sectors in the U.S. The growth in the banking sector is mainly driven by the rate of mergers and acquisitions within the industry, which is expected to weaken as integration projects go through completion.⁴⁵

U.S. System Integration Spending by Industry, 2002-2007



Source: IDC

Figure V-12. Systems Integration –U.S. spending by industry in millions \$.⁴⁶

VI. Market Entry Barriers

Entry barriers are factors that limit competition by preventing the entry of new firms. An entry barriers (EB) analysis brings value to a firm by categorizing the forces that act against the firm's potential success in a given market. Through this analysis a firm has the opportunity to foresee the forces that could act against their plans and develop a strategy that may counteract these challenges, thus increasing its chances of success.

A. Competition models

Entry barriers differ from industry to industry, depending on the products and services rendered by the firm. In general, industries may follow one of two paths that will dictate the range of entry barriers to be experienced. Depending on the goods produced, a firm may be categorized as a price taker firm. Under this condition, a firm must take the price of the good assigned by the market: the firm has no control over its price and can expand or contract their production to adjust their costs, but have no pricing advantages. In general, there are little to no barriers to entering these types of industries.*

On the other side, the firm may belong to the price searcher category, where they rely on advertising and branding to leverage their pricing adjustments. Firms undergo trial and error events where they search

* Price-takers participate within what is known as perfect competition. Perfect competition features buyers with homogeneous products (the same type, quality) and enter the market freely (no entry barriers).

the prices that maximize their revenue. Price searchers have greater challenges from barriers to entry.* Nevertheless, these markets provide more profit incentives for firms to attempt and break the barriers to entry. In general, price-searcher firms have the opportunity to increase prices and not loose all customers given that there is not a standard market price for the good or service. Product differentiation is achieved through branding, advertising, and measured through customer loyalty. Table VI-1 shows examples of price-searcher and price-taker markets.

Table VI-1. Examples of price-searcher and price-taker industries

Industry	Category	Influential Factors to Category
Automotive, Consumer products	Price searcher	Firms rely heavier on the price of goods and less on cost efficiencies to maximize profits. The manipulation of the price is leveraged through branding, advertising, and customer loyalty power of the firm. Strong contenders focus equally on the revenue through price and the maximization of cost efficiencies to gain stronger positions in the market.
Farming, Oil	Price taker	Prices constrained by the market: producer cannot sell above the market price. Firms experience perfect competition and rely most heavily in cost efficiencies to generate profits.

B. Competition in the IT services market

Despite the relatively young age of the market, some IT sub-markets are already experiencing commoditization. Within the KM field, the hardware portion of the data storage market is experiencing the effect of a decline in raw materials cost with their increase in production; -it is becoming a commodity and thus has adopted price-taker behavior. Both the overall disk sales as well as the price per megabyte of storage are in decline, reflecting the decrease in costs and increase in technical maturity of the industry.⁴⁷ The remaining sub-segments of the data storage field (SW, consultant services, management and others, see Appendix III) still enjoy a price-searcher status as they are services-oriented segments that are not impacted by hardware trends. Until methods and tools for delivering KM applications become standardized, the markets associated with KM will not be prone to commoditization. Similarly, web services and systems integration can leverage branding power to obtain price due to the low level of standardization.

Table VI-2 shows the IT services within the scope of this paper classified by their competition model based on the aforementioned discussion.

Table VI-2. Classification of the competition models for IT Services

IT Industry	Assigned Competition Model
KM – Communities	Price searcher
KM – Data Storage	Price searcher
KM – Document Management	Price searcher
Web Services	Price searcher

* Price-searchers differ from price takers in that there is product differentiation (non homogeneous services or goods).

1. Weighted contributions of Entry Barriers

To better understand the ease of market entry, each market segment was evaluated against a set of entry barriers. These entry barriers constitute a standard set of market forces experienced across most market types. Table VI-3 contains the definitions of the various entry barriers used for the evaluation exercise.

Table VI-3. Entry barriers used in the market analysis. ⁴⁸

Entry Barrier	Definition and Scope
Capital requirements	Becomes a barrier when the costs of getting established in an industry are so vast as to discourage all but the largest companies; Entrants are required to invest in highly specialized assets.
Economies of scale	For industries that are capital or research intensive, in order to gain efficiency a high production volume is required.
Absolute cost advantages	Captures the cost efficiencies of established firms that may pose a threat to those entering a market. Manifested differently depending whether the product is a packaged good versus a service (such as consulting): <ul style="list-style-type: none"> • Packaged goods: Cost efficiencies gained through leveraging hardware and software suppliers • People, labor: Includes the forces exerted from off-shore outsourcing competition on price for resources (labor, materials) • Services and consulting
Reputation requirements and Product differentiation	This provides those firms that are pre-established in an industry the advantage of customer loyalty and brand recognition over new entrants. New entrants may compensate by taking a niche position, spending on additional advertising, or cutting prices to compensate.
Access to channels of distribution	This relates to the distributor's side of the balance: the distributor may prefer an established vendor (s) for a given industry under constraints of capacity (storage space), risk aversion (product may not sell), and/or additional inventory carrying costs.
Governmental and Regulatory Barriers	Examples include granting of licenses for a service (taxis, telecommunications, banking), for knowledge-intensive industries patents, trade secrets and copyrights. Heavy government regulation occurs through procurement and environmental and safety standards.

A technique called analytical hierarchy process (AHP) was used to evaluate the relative importance of each entry barrier for a given market. The main objective of using AHP is to convert the subjective assessment of entry barriers into a set of scores. For this process, each entry barrier pair is compared and assigned a relative weight of importance as follows:

- 10 = Much more important
- 5 = More important
- 1 = Equally important
- 1/5 = Less important
- 1/10 = Much less important

Each row is then summed and its percent calculated from the sum of total scores to yield a relative percent importance.

a) Knowledge Management – Data Storage

Governmental and Technological Regulations:

Newly implemented requirements for records management have placed a strong set of regulations around data storage for firms. The Sarbanes-Oxley Act, Title VIII, directs the SEC to regulate the practices surrounding the retention of auditable records containing conclusions, opinions, analyses or financial data. Additional requirements to the data storage field come from the National Association of Securities Dealers (conduct rule 3010): Companies are now required to monitor communications between brokers and the general public.⁴⁹ As a key enabler to these recent regulations, data storage now enjoys from an increase in demand. Given the proprietary bounds within the storage field are low, the overall regulatory threshold exerted from the sum of governmental and technical barriers is low.

Reputation and Product Differentiation:

After consolidations, large vendors have come to dominate the picture. Some examples include the acquisition of Crystal Decisions by Business Objects (reporting tools) and the merger between Hyperion and Brio (reporting software technology).⁵⁰ Larger vendors dominating the data storage landscape include IBM, SAS, Microsoft and Oracle.

Besides regulatory barriers, branding and product differentiation plays a strong role given that data storage is no longer manifested as a packaged good but rather an architecture of products and services customized to specific needs. IT firms have two main approaches to dealing with branding power: provide the entire gamut of services (hardware, software, consulting) themselves, or partner with a strong-branded supplier of software and hardware.

An example of a strong-branded vendor is IBM. Their product Visual Warehouse represents an example of such offering, which is complemented along with their consulting services arm to provide hardware and supporting services.

Alternately, Future Works constitutes an example of a smaller vendor leveraging the strong brand of its suppliers to contend with the reputation forces from this market: This firm has partnered with Microsoft for their data storage software products to benefit from the supplier's brand.⁵¹

Absolute Cost Advantages:

In the data storage services market, cost efficiencies are gained not only through low cost of materials, but also by leveraging costs wisely through the economies of learning. NCR, one of the market leaders in data storage services, provides an example of how firms contend with the challenges posed by cost efficiencies from already established firms in the market. NCR relies on third party vendor product support for areas such as the data base infrastructure (Oracle and others), data transfer (Praxis), and query/analysis

functions (Cognos and others).⁵² Outsourcing software and hardware components provides NCR the opportunity to choose from best in class suppliers that compete in cost efficiencies, further passed on to as part of the NCR “solutions” base. Firms like NCR opt to not incur in the costs of development of components, but rather source these from more cost efficient entities.

Capital requirements & Economies of Scale:

Other aspects such as economies of scale and capital requirements represent a small market entry force given that the data storage field is no longer based on hardware products alone but rather in architecture and services supporting the storage functions. As data storage migrates from product to architecture, the dependency on capital decreases. Through the outsourcing of hardware and software components, the market is migrating from “boxed products” to customized services with suppliers partnering for components or back-end support.

Access to channels of distribution:

Similarly, distribution channels play a minimal role provided the goods from the data storage market cannot be physically stored in inventory as it becomes an architecture of services. The internet has also played a key role in weakening this barrier given that data transfer is no longer dependant on the transportation of disks and is now enabled through networks – no movement or physical transportation required.

Knowledge Management - Data Storage Criterion vs. Criterion Contribution Estimates	Capital requirements	Economies of scale	Absolute cost advantages	Reputation and Product differentiation	Access to channels of distribution	Governmental and Regulatory Barriers	Row Total	Relative % value
Capital requirements	1	1	0.1	0.1	0.1	0.2	3	2%
Economies of scale	1	1	0.1	0.1	0.1	0.2	3	2%
Absolute cost advantages	10	10	1	0.2	5	10	36	30%
Reputation and Product differentiation	10	10	5	1	10	10	46	38%
Access to channels of distribution	10	10	0.2	0.1	1	1	22	18%
Governmental and Technological Regulatory Barriers	5	5	0.1	0.1	1	1	12	10%
							122	

Figure VI-1. Entry barrier contributions to Data Storage (Knowledge Management).

b) Knowledge Management – Enterprise Content Management

Governmental and Technological Regulations:

Similar to data storage, the enterprise content management (ECM) market has also been impacted by the new regulatory initiatives, such as the Sarbanes-Oxley Act.⁵³ Companies are now required to upgrade their content management infrastructures to meet the new corporate anti-fraud accountability guidelines. The relationship of these guidelines to ECM is drawn by the Title VIII of the act, which addresses specific

aspects of content management such as destructing, altering, concealing or falsifying records in any form. Despite these new governmental requirements, firms offering ECM products do not experience strong forces against them when entering this market. In fact, the ECM market is impacted positively by the surge in content management needs.

Little influence was attributed to the technological proprietary regulatory barriers. This is due to the fact that a vendor's focus is on combining existing best-of-breed technical components to reduce costs and attract customers.⁵⁴

Reputation and Product Differentiation:

Reputation and product differentiation represents a strong barrier to new entrants. Customers prefer larger vendors that offer an integrated set of content management products. Customers view the engagement with large vendors as a means to reduce the probability of interoperability issues originating from integrating separate vendors.⁵⁵ Two of the market leaders in this field are EMC and VERITAS.

With a solid performance in data storage products, EMC now offers a comprehensive line of hardware, software and services for enterprise content management. Through 2003 and 2004, EMC made three major acquisitions to expand its capabilities on enterprise content management software (from Documentum), storage management software (LEGATO Systems), and infrastructure visualization software (VMWare).⁵⁶ EMC now constitutes a strong player in this market with a broad set of products.

The second market leader, VERITAS, offers software products focusing on the analysis of usage patterns to direct files to the appropriate storage destinations. Product features include file security management for restricted access and editing.

Absolute Cost Advantages:

Cost advantages represent a weak barrier given the availability of for lower cost options from the outsourcing of labor offshore for functions such as product support and back-end operations. Areas in enterprise content management related to legacy application maintenance and enterprise resource planning enhancements are susceptible for outsourcing.⁵⁷

Capital requirements & Economies of Scale:

All other barriers comprehending capital investment and economies of scale have minimal impact to those entering the enterprise content management market. The rationale for the low weighting of these categories comes from the ECM market scope defined in section V.A.3:^{*} Small capital investments are required to establish a firm on this market as people and current technology represent their main resources. Operations can respond to variable product demand through the adjustment of human resources as a countermeasure to barriers of economies of scale.

Access to channels of distribution:

^{*} ECM applications build, organize, manage, store, make accessible, create access to, or deliver information in a variety of media formats.

Given the scope of the content management market (as discussed in the market demand section) little influence is attributed to the distribution channels provided that the products are not dependent on inventories or physical transportation.

Knowledge Management - Enterprise Content Management Criterion vs. Criterion Contribution Estimates	Capital requirements	Economies of scale	Absolute cost advantages	Reputation and Product differentiation	Access to channels of distribution	Governmental and Regulatory Barriers	Row Total	Relative % value
Capital requirements	1	1	0.2	0.1	1	0.2	4	4%
Economies of scale	1	1	0.2	0.1	5	0.2	8	9%
Absolute cost advantages	5	5	1	1	1	1	14	16%
Reputation and Product differentiation	10	10	1	1	10	10	42	48%
Access to channels of distribution	1	0.2	1	0.1	1	5	8	9%
Governmental and Technological Regulatory Barriers	5	5	1	0.1	0.2	1	12	14%
							88	

Figure VI-2. Entry barrier contributions to Enterprise Content Management (Knowledge Management).

c) Knowledge Management – Knowledge Management Communities

Governmental and Technological Regulations:

Technical and governmental regulations do not pose a barrier for new entrants to the knowledge management communities market. Little to no proprietary barriers exist given the level of standardization of Internet technology supplied to the most common groupware solutions (IM, web conferencing, email).⁵⁸ Recent governmental regulations have forced firms to revise their information exchange processes, with the favorable outcome of added demand to the KM communities and collaboration field. Table VI-4 shows a breakdown of five of the most influential regulations recently implemented.

Table VI-4. Summary of governmental regulations.

Regulation name	Impact description	Relevant Technology Impacted
Safe Harbor	Safe harbor privacy regulates information transfers from and to the European Union of personally identifiable information or PII	Emails, IM, Web conferencing – across all firms and industries
SEC Rule 17-a-4	For US securities brokers and dealers, imposes a six year life on all documents pertaining to customer accounts, archiving information exchanged with internal and external parties	Email, IM, Web conferencing – across all firms and industries
Gramm-Leach-Bliley Act	For US financial institutions, impacts information sharing practices about consumer information, its usage and disclosure	General electronic media exchange for financial institutions
HIPAA	Health Information Portability and Accountability Act. Primarily impacts the processes where patient record exchange occurs as well	General electronic media exchange for healthcare

	as the intended use of the information	industry
FDA's CFR21 Rule 11	Creation, modification, maintenance, and transmission of electronic records, authentication of electronic signatures	General electronic media exchange for food and pharmaceutical industries

Reputation and Product Differentiation:

Overall the market experiences high fragmentation and currently undergoes consolidations as the solutions portfolio expands from single point collaboration to enterprise wide applications.⁵⁹ While in this state of flux, branding and reputation are strong forces as the leaders in the field leverage their competencies. The market leaders include Novell with their product GroupWise, Microsoft (Exchange 2000 Server), and the IBM/Lotus product family.⁶⁰

Absolute Cost Advantages:

Absolute cost advantages were given a weak influence given the option of leveraging costs through offshore outsourcing. Aspects of KM communities processes such as application support, help desks and legacy application maintenance are susceptible to outsourcing as companies look to meet their internal cost pressures.⁶¹

Capital requirements & Economies of Scale:

Capital and economies of scales exert little influence as barriers for this market provided that the “product” is really a bundle of services such as consulting, training and maintenance – all related to human versus capital investment factors.

Access to channels of distribution:

This barrier has little influence on this market given that the nature of the products does not rely on packaged goods. The knowledge management communities market covers those tools and processes supporting portal environments that promote user collaboration. Collaborative requirements management tools and tools supporting workflow analysis are examples of these tools, which are customized programmed products versus a boxed product.⁶²

Knowledge Management - Collaborative Communities Criterion vs. Criterion Contribution Estimates	Capital requirements	Economies of scale	Absolute cost advantages	Reputation and Product differentiation	Access to channels of distribution	Governmental and Regulatory Barriers	Row Total	Relative % value
Capital requirements	1	1	0.2	0.1	1	0.2	4	4%
Economies of scale	1	1	0.2	0.1	5	0.2	8	9%
Absolute cost advantages	5	5	1	1	1	1	14	16%
Reputation and Product differentiation	10	10	1	1	10	10	42	48%
Access to channels of distribution	1	0.2	1	0.1	1	5	8	9%
Governmental and Technological Regulatory Barriers	5	5	1	0.1	0.2	1	12	14%
Grand Total							88	

Figure VI-3. Entry barrier contributions to Collaborative Communities (Knowledge Management).

d) Systems Integration and Web Services

Governmental and Technological Regulations:

Changing business conditions as well as efforts to improve risk management has led corporations to focus on improving their overall approach to becoming leaders within their competitive field.⁶³ Competition has increased the demand for systems integration (SI) and web services (WS) products. Governmental regulations, such as Sarbanes-Oxley, have also played a role in the surge of demand given the requirement to integrate disparate systems for compliance. These trends have favored these two market segments by increasing demand, and have not posed significant governmental barriers.

However, fundamental technological differences have given rise to proprietary barriers specific to the systems integration field. The use of proprietary technology in the effort of integrating legacy systems represents a significant difference between SI and WS, shown through the technical component of the “governmental and technological regulatory barriers” row in Figures VI-4 and VI-5.⁶⁴

Reputation and Product Differentiation:

Reputation, more than product differentiation, poses a strong force against those entering these markets. The solutions sold under these two markets are not product specific but rather platform dependant. Therefore, a particular product or brand was not found to have a market leadership position. IBM and Microsoft are considered the leaders of the SI market due to their ability to interpret the needs of the market and their ability to meet those needs.⁶⁵ For web services, Microsoft’s (.Net) and Oracle (9i Application Server) figure as the most used platforms for both current and planned integration projects.⁶⁶

Absolute Cost Advantages:

Similar to other IT fields, the ease of access to offshore outsourcing as a low cost alternative dilutes any cost advantages from those already established in the market. In particular, the project-based nature of the work for these two fields lends itself to enterprise application integration and web services.⁶⁷

Capital requirements & Economies of Scale:

Capital requirements and economies of scale have a smaller impact on these two markets. Larger firms may have some scale advantages given the power to finance larger research teams that enable new technology standards -some proprietary, some not- that may enhance their market positions.⁶⁸

Access to channels of distribution:

Similar to other service related IT fields, the SI and WS solutions do not require physical storage or transportation, rendering these barriers small.

Systems Integration Criterion vs. Criterion Contribution Estimates	Capital requirements	Economies of scale	Absolute cost advantages	Reputation and Product differentiation	Access to channels of distribution	Governmental and Regulatory Barriers	Row Total	Relative % value
Capital requirements	1	1	0.1	0.1	1	0.1	3	4%
Economies of scale	1	1	1	0.1	5	1	9	10%
Absolute cost advantages	10	1	1	1	1	1	15	16%
Reputation and Product differentiation	10	10	1	1	10	5	37	41%
Access to channels of distribution	1	0.2	1	0.1	1	0.1	3	4%
Governmental and Technological Regulatory Barriers	10	1	1	0.2	10	1	23	25%
Grand Total							91	

Figure VI-4. Entry barrier contributions to Systems Integration.

Web Services Criterion vs. Criterion Contribution Estimates	Capital requirements	Economies of scale	Absolute cost advantages	Reputation and Product differentiation	Access to channels of distribution	Governmental and Regulatory Barriers	Row Total	Relative % value
Capital requirements	1	1	0.2	0.1	1	0.2	4	4%
Economies of scale	1	1	1	0.1	5	1	9	11%
Absolute cost advantages	5	1	1	1	1	1	10	12%
Reputation and Product differentiation	10	10	1	1	10	10	42	52%
Access to channels of distribution	1	0.2	1	0.1	1	5	8	10%
Governmental and Technological Regulatory Barriers	5	1	1	0.1	0.2	1	8	10%
Grand Total							81	

Figure VI-5. Entry barrier contributions to Web Services.

C. Market EB summary

In summary, the strongest force against those entering these markets will be exerted by reputation and product differentiation. Well established leaders play a strong role not only against those entering the markets, but also within their competitors – power that they leverage through partnerships and acquisitions of those competitors considered a threat. Leaders are powerful enough to control competition by encouraging

partnerships with smaller, emerging vendors depending on the competitive risks these bring. This was observed through some of the examples mentioned throughout the entry barriers analysis.

Absolute cost advantages and regulatory barriers (both governmental and proprietary) followed as the second set of forces acting against market entrants. These barriers were found to be specific to the IT segment in scope: Markets relying on hardware components experience heavier influences from cost efficiencies, while other markets are subject to proprietary fluxes that enable market share advantage. Forces from governmental regulations were low across the markets analyzed given that they increase the demand for IT services for those requiring meeting them.

Table VI-5. Summary of EB forces by IT market.

Average % Contribution of Entry Barrier Forces by IT Market	KM Data Storage	KM Communities	KM Enterprise Content Management	Systems Integration	Web Services	Average % Contribution
Capital requirements	2%	4%	4%	4%	4%	4%
Economies of scale	2%	9%	9%	10%	11%	8%
Absolute cost advantages	30%	16%	16%	16%	12%	18%
Reputation and Product differentiation	38%	48%	48%	41%	52%	45%
Access to channels of distribution	18%	9%	9%	4%	10%	10%
Governmental and Technological Regulatory Barriers	10%	14%	14%	25%	10%	15%

VII. IT Services Market Analysis

Data storage, content management and knowledge management communities are experiencing growth. Growth will continue as corporations seek to improve existing data systems versus implementing new ones. The underlying avoidance of cash spending will continue driving corporations to increase their efficiencies of the resources at hand. This affects not only knowledge management sectors but also those that impact systems interoperability, which is a key enabler of knowledge management processes. Some of the growth for the U.S. can also be attributed in part to the recent focus on data security for business resumption plans, as it was a lesson learned from past terrorist attacks.

The data storage sub-segment, however, is experiencing some commoditization as it includes hardware sales as part of the data storage contracts. Nevertheless, this appears to have no significant impact on the growth of this services segment.

Meanwhile, the systems integration market may be experiencing some substitution by the web services market. Predicted systems integration growth for the US has flattened, while web services are predicted to grow at a pace that doubles for the next three years. Substitution may be prompted due to the need of lower cost alternatives to middleware for the integration of disparate systems. The standards approach to web services backbone technology enables lower long-term costs to those firms wishing to improve enterprise-wide systems. Nevertheless, systems integration and web services will continue in a state of flux until technology matures and standards are agreed upon. Market leaders will continue to influence the evolution of standards as a mean to secure a part of the market.⁶⁹

For the markets inside the scope of this project, barriers to entry in general were found to be low. Proprietary regulations are not a strong force except in systems integration. Governmental regulations also exert insignificant effects over these markets. Market entrants experience mostly branding as the strongest force against them: Market leaders wield partnerships and acquisitions to broaden their competencies and achieve dominance. This is the case of the strongest two contenders for these markets: Microsoft and IBM. Other barriers related to capital investments, economics of scale and distribution exert a weak force for those entering these markets excepting data storage, which also includes part hardware sales (as defined in the market scope, Appendix III).

Despite the strength of the brand of the market leaders in these fields, there is still potential for revenue to those engaging these IT services. This is due to the fragmented nature of these IT markets, supported by the concentration ratio data from U.S. Economic Census. For knowledge management fields, the 4 largest firms encompass 33% of the goods sold in this market.*⁷⁰ Fragmentation is also strong for the

* 4 largest firms had a total of \$18.29 billion dollars at 32.7% of the market in 2002. Total sales at \$55.8 billion dollars. Encompasses data storage, content management and knowledge management communities markets.

web services and systems integration markets, with the 4 largest firms owning only 21% of the market. * ⁷¹ Compared to the ISP and web search portal segments of the IT field, where the top 4 vendors have 56.4% and 52.7% of market share, the KM sub-markets, as well as web services and systems integration markets will experience much less competition for those wishing to offer these services.

VIII. Conclusions

Overall, the five IT markets analyzed have a relatively low concentration of firms when compared to other IT fields such as ISP providers and webs search portals. In addition, no significant entry barriers were identified for any of these markets. The combination of these two elements makes these markets a very attractive area to enter as a firm. This is further confirmed by the level of fragmentation of these markets where even the top 50 companies do not own beyond 59.3% and 47.6% for knowledge management and integration related services respectively. Compared to ISP and web search portals at 81.7% and 92.8% for the top 50, it is clear that the level of fragmentation in these markets is much higher.

Despite the presence of leaders in these markets, branding power has not been enough to stop market entrants. This, again, is manifested through the fragmented nature of these market segments: there are many competitors and the leaders still lack a significant grip on the market shares (opposite to the ISP and web search portal markets).

Markets recommended include storage outsourcing as well as web services given their forecasts for healthy growth. The optimistic growth outlook for web services also makes it an attractive area to enter. This growth is supported by the already discussed customer surveys: there is and will continue to be a need to integrate systems within corporations. Lower cost options such as web services have the competitive advantage from the customer's perspective. Topped by the low capital investments required, these areas seem like low risk alternatives within the IT services.

Suggested next steps for this market analysis revolve around the other elements within the business marketing plan. Further market research includes a deeper dive into customer needs to make a connection between the predicted market demands and the voice of the customers in the field. A secondary next step revolves around formulating a competitive advantage plan to cater for the competition the business will experience when entering these markets. Lastly, the firm should perfect their vision of the target market to be pursued as part of entering the IT services.

* 4 largest firms had a total of \$30.7 billion dollars at 17.5% of the market in 2002. Total sales at \$175.0 billion dollars. Encompasses both web services and system integration markets.

IX. Appendices

A. Appendix I

For purposes of the analyses, the compounded annual growth rate is defined as follows:

$$CAGR = \left(\frac{I_E}{I_B} \right)^{\frac{F}{n}} - 1,$$

where:

IE ≡ Ending period value in U.S. dollars

IB ≡ beginning period value in U.S. dollars

F ≡ Annual frequency of series (i.e., monthly = 12, annual = 1)

n ≡ Spanning period (year to year = 1, for 5 year period n = 5)

Remarks about CAGR: ⁷²

- CAGR is an imaginary number that describes the rate at which an investment grew as though it had grown at a steady rate. Therefore, it does not necessarily represent reality.
- It is best when applied to evaluate the performance of different investments over time, provided all are compared against the same time period.
- CAGR does not encompass risk factors or probabilities.
- To reduce the risk of the analysis, CAGR requires ongoing revisions that reflect recent performance.
- Relative investment risk can be measured or analyzed by using standard deviation of the CAGR estimates.

B. Appendix II – KM Communities Services: Raw data

Table 8-1 lists the raw data for the KM communities market size.

Table IX-1. KM Communities – Raw data table for market size.

Data Category	Geography	Year	Market Size (\$M)	AGR (%)	CAGR (%)	Key Assumptions
Knowledge management services	World Wide	2002	2900			Weak global and US economic conditions and a decline in discretionary business investment are among the major factors impacting the forecast.
		2003	3555	22.6%		
		2004	4359	22.6%		
		2005	5344	22.6%	25.1%	
		2006	7100	32.9%	22.6%	

C. Appendix III – Data Storage Services Definitions

Table 8-2 defines the service categories cited in the Data Storage Services analysis. The market analysis data includes the contributions of each service subcategory.

Table IX-2. Storage Services – Definitions for service subcategories.

Storage Service Type	Scope of the Service
HW maintenance and support services	Includes preventive and remedial services that physically repair or optimize hardware. Includes contract or per-incident repairs. Includes online, telephone support and warranty updates. Part sales (out of contract inclusive) are included.
SW maintenance and support services	Long term and pay-as-you-go contracts. Telephone and online troubleshooting included. Maintenance includes delivery of updates and enhancements. Includes storage-unique operating systems, storage management SW, tools and utilities.
Storage consulting services	Advisory services that aligns business objectives with storage strategies. Provides strategic, architectural, operational, and implementation planning related to storage.
Implementation services	Support the implementation and rollout of the new storage infrastructure. HW/SW procurement, configuration, tuning, staging, installation, and interoperability testing.
Training and educational services	Specific to vendor technologies or deployed as part of the professional services engagement (storage product).
Management services	Transfer part or entirely the responsibility of the storage environment. May include transfer of ownership to an outside vendor. May include operations and support, capacity planning, asset management, administration, availability, remote monitoring, technical diagnostics, troubleshooting, asset management, performance management, configuration management, management reports.

D. Appendix IV – Data Storage Services: Raw data

Table 8-3 lists the raw data for the Data Storage Services market size.

Table IX-3. Storage services – Raw data table for market size. ^{73, 74, 75}

Market Sub-Segment	Geography	Year	Market Size (\$M)	AGR (%)	CAGR (%)	Key Assumptions / Remarks
Data Storage Services	North America	2001	12158			Continued worldwide economic slump, thus reduces IT spending related to all services types.
		2002	12621	3.8%		Storage hardware prices declining due to commoditization.
		2003	13390	6.1%		
		2004	14337	7.1%		
		2005	15589	8.7%		
		2006	17110	9.8%	7.1%	
Data Storage Services	Europe	2003	750			EU (European Union) requirements for six-year storage of business email and enhanced defenses against cyber crime.
		2004	931	24.2%		B2B trade expected to grow from 1%/2001 to 22%/2006.
		2005	1242	33.3%		Euro converted to dollar by factor of 1 Euro = 1.22560 US Dollar (Oanda.com)
		2006	1652	33.1%		
		2007	2313	40.0%		
		2008	3543	53.2%	36.0%	

Storage outsourcing	US	2002	451			Sept-11 incident has driven storage demand for business resumption purposes.
		2003	690	53.0%		
		2004	981	42.2%		
		2005	1201	22.4%		
		2006	1395	16.2%	33%	

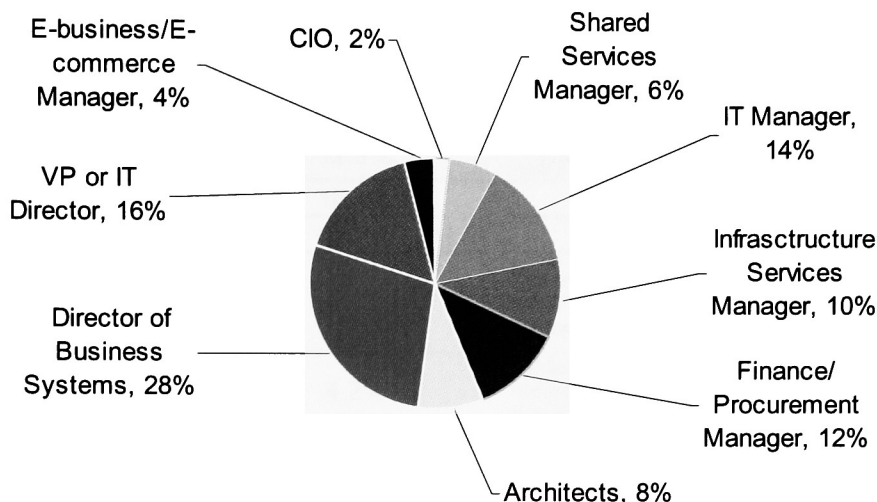
E. Appendix V – Systems Integration Services: Raw data

Table IX-4. Systems Integration – Raw data table for market size.

Source	Geography	Year	Market Size (\$M)	AGR (%)	CAGR (%)	Key Assumptions / Remarks
Systems Integration IDC	W W	2002	64494			High impact from the low corporate profit growth will make companies extremely reluctant to make IT investments that do not immediately pay off in higher returns
		2003	62414	-3.2%		Buying behavior will change w.r.t. outsource vs insource projects
		2004	63908	2.4%		WW results are a rollup of local IT services forecasts.
		2005	66711	4.4%		
		2006	70670	5.9%		
		2007	74847	5.9%	3.0%	
Systems Integration Forrester Research	W W	2002	87800			Includes Packaged applications implementation, customized applications development, and applications integration.
		2003	92400	5.2%		
		2004	97400	5.4%		
		2005	103000	5.7%		
		2006	109000	5.8%		
		2007	115300	5.8%	6.0%	
Systems Integration IDC	U.S.	2002	26440			Global political concerns (Iraq post-war efforts) contribute the greatest degree of uncertainty.
		2003	24378	-7.8%		Market declined over 2003 - will pick up in 2005.
		2004	24256	-0.5%		
		2005	24619	1.5%		
		2006	25333	2.9%		
		2007	25789	1.8%	-0.5%	

F. Appendix VI – Web Services Usage Trends Survey Demographics

Titles of End-User Respondents to Consulting and Systems Integration Survey



Source: Gartner Dataquest (February 2003)

G. Appendix VII – Web Services: Raw data

Table IX-5. Web Services– Raw data table for market size.

Source	Geography	Year	Market Size (\$M)	AGR (%)	CAGR (%)	Key Assumptions / Remarks
Web Services Professional Services	U.S.	2002	765			Report highlights summary. Includes 63 constituent segments from 2002 to 2007.
		2003	1484	94.0%		U. S. only
		2004	2878	94.0%		
		2005	5582	94.0%		
		2006	10827	94.0%		
		2007	21000	94.0%	94.0%	
Web Services Professional Services	Western Europe	2002	108			Report highlights summary. Includes 63 constituent segments from 2002 to 2007.
		2003	254	135%		Western Europe
		2004	598	135%		
		2005	1408	135%		
		2006	3314	135%		
		2007	7800	135%	135.0%	

H. Appendix VIII – Enterprise Content Management: Raw data

Table IX-6. Enterprise Content Management– Raw data table for market size.

Source	Geography	Year	Market Size (\$M)	AGR (%)	CAGR (%)	Key Assumptions / Remarks
Content & Document Management Services	U.S.	2002	2580			The economy will have moderate impact provided the focus on projects for cost reductions, revenue growth and customer satisfaction primarily
		62%	2003	2666	3.3%	Moderate-high impact from industry-specific regulations. Industries such as government and healthcare create opportunities.
		62%	2004	3038	14.0%	High impact from the tech. developments provided these drive the adoption of the services. Demand for customization and project execution expertise is high.
		60%	2005	3417	12.5%	The emergence of a new content infrastructure will drive a new adoption wave. High impact.
		61%	2006	3968	16.1%	
		62%	2007	4570	15.2%	12.1%
Content & Document Management Services	W W	2002	4117			The economy will have moderate impact provided the focus on projects for cost reductions, revenue growth and customer satisfaction primarily
		2003	4288	4.2%		Moderate-high impact from industry-specific regulations. Industries such as government and healthcare create opportunities.
		2004	4927	14.9%		High impact from the tech. developments provided these drive the adoption of the services. Demand for customization and project execution expertise is high.
		2005	5708	15.9%		The emergence of a new content infrastructure will drive a new adoption wave. High impact.
		2006	6462	13.2%		
		2007	7367	14.0%	12.3%	

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