Economic Trends in Enterprise Search Solutions

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■ Acknowledgements

■ Executive Summary

Enterprise search technology retrieves information within organizations. This data can be proprietary and public, and access to it may be restricted or not. Enterprise search solutions render business processes more efficient particularly in data-intensive companies. This technology is key to increasing the competitiveness of the digital economy; thus it constitutes a strategic market for the European Union. The Enterprise Search Solution (ESS) market was worth close to 1,100 million USD (approximately 831 million EUR) in 2008 and is expected to grow quicker than the overall market for information and knowledge management systems (Gartner 2009). Optimistic market forecasts expect market size to exceed 1,900 million USD (approximately 1,435 million EUR) by the end of 2013. Other market analyses see the growth rate slowing down and stabilizing at around 10% a year as from 2010. Even in the least favourable case, enterprise search remains an attractive market, particularly because of the opportunities expected to arise from the convergence of ESS and Information Systems.

This report looks at the demand and supply side of ESS and provides data about the market. It describes the current situation and presents the evolution of market dynamics over the past decade. Our main thesis is that ESS is currently placed at the point where two established markets, namely web search and the management of information systems, overlap. The report offers evidence that these two markets are converging and discusses the role of the different stakeholders (providers of web search engines, enterprise resource management tools, pure enterprise search tools, etc.) in this changing context.

Market structure

A characteristic feature of the ESS market is its diversity. In this report, ESS providers have been categorized by their turnover and product range in order to understand their role in market dynamics. We find that the nine most influential actors control 84% of the ESS market. Though many other dynamic ESS providers are active in niche markets; they have tiny market shares. This degree of concentration is unusually high and contrasts with markets for other software-based industries. We can therefore say that competitive structure resembles an oligopoly with a 'broad fringe' of smaller players.

This oligopoly–fringe structure has two interesting assets. First, it favours innovation in the industrial ecosystem. ESS providers tend to form fruitful partnerships: small firms cooperate with big firms to develop solutions for the mass market, and big firms work with smaller firms to provide innovative solutions. Second, it allows smaller players to provide solutions for niche markets, such as search tools for e-discovery and compliance. At some subsequent stage, these innovations are often integrated into the product range of larger providers.

In order to describe this market's structure, the report analyses three providers in different market positions. *Autonomy,* the dominant market player, has a high turnover, high market shares and high market power. Its positioning could change in the coming years, as its main activity could be applied to information management. The company *Fast,* a medium-sized player in terms of turnover, provides a case study of a growing company which is being acquired by a large player (Microsoft). *Exalead*, one of the European leaders in ESS, is a growing firm, with the potential to become a major provider. It may also be acquired in the years to come.

The competitive structure of the ESS market suggests two possible paths for the future. First, the

competition may be led by pure ESS players, which could penetrate adjacent markets (such as enterprise content management or business intelligence). Second, the market could be increasingly dominated by 'outsiders' from other information systems markets. Acquisitions and mergers are likely to occur in the coming years, threatening the survival of many pure ESS players. In both cases, the market structure will be reconfigured.

Increasing demand, selection criteria and consequences for the ESS value chain

The search process is made up of several building blocks, such as crawling data, indexing information, retrieving information, and reporting and analysing the content. These blocks are largely independent and ESS providers design and configure them specifically to meet the demands of their clients. These technological building blocks can be mirrored in an economic model, attributing each of them with a function in the value chain. Our analysis suggests that upcoming changes in operational practices within organizations will influence the demand for ESS.

In particular, the demand side increasingly requires added value services beyond mere search. Intelligent clustering, functional categorisation, semantic analysis, advanced query processing, and user-friendly presentation of information are examples of such new demands received by ESS providers. This poses additional technological challenges for ESS providers. It also redefines the relative importance of a number of elements in the value chain. In addition, many clients demand a higher level of customization, quality and efficiency in the solutions offered (in terms of accessibility and ergonomics) in, for example, security, scalability, collaborative features. Here again, the ability to respond to user requirements is a distinguishing element between providers.

The demands mentioned above introduce new blocks into the search process and its value chain. Comparing the former value chain to the future one, makes us believe that that value will shift from the 'basic' technological components of search (content collection, crawling, etc.) towards user-centric components, such as clustering categorisation or result visualization, and advanced technological modules, such as semantic analysis, or natural language. This 'upgrade' in the value chain will have an impact on the cost structure, which, in turn, will also have consequences for the way products are provided. Traditionally, most ESS providers offered complete enterprise search solutions. More recently, a specialization process seems to be ongoing, with companies focusing on modules of semantic analysis, result presentation, reporting and analytics, or collaborative features.

Consequently, two main trends appear to be influencing the market and value chain. First, specialization is taking place, as many small firms are being set up to develop particular aspects of enterprise search. Second, following a vertical integration scheme, larger market players are buying up some of these smaller innovative firms, for example the acquisition by Microsoft of Fast Search and Transfer.

In this report, we also provide an overview of the cost structure of the various solutions for procuring enterprise search software, such as licences or services. We list the different types of contracts for acquiring a search solution and attempt to weigh up the costs associated with each one. It is beyond the scope of this study to calculate the cost of a full implementation. This would have to be done on a case-by-case basis to calculate the specific return on investment for a particular case, considering –for instance– the sunk cost of user adaptation. However, our review confirms that the ROI can, indeed, be estimated, and that search solutions are very profitable.

On a more general level, we can say that –from a corporate point of view– the decision to purchase a search engine goes beyond mere economic calculation of the "price" of the

solution and its return on investment (ROI). In fact, it is also a strategic decision of the company (and its business model) whether to implement the search solution via SaaS (software as a service) operated by an external company, or as a proprietary system completely handled by the customer. Sometimes, such decisions cause tensions between different departments of a company: the company's information system supervisor may favour a search solution that ensures the security of sensitive data, while the commercial department would favour SaaS in order to save costs. Such tensions translate into (sometimes latent) indirect costs. We conclude that the price of implementation and, to an ever greater extent, indirect costs is the main factors that influence choice.

Further market consolidation expected

The ESS market has witnessed several waves of market consolidation which have resulted in an overall decline in the number of ESS providers over time. From 2002 to 2006, the market was highly dynamic, with many companies battling with innovation. In this phase, consolidation was characterized by acquisitions amongst ESS competitors and expansion to specific domains. In a second wave, non-specialized search players, mainly large infrastructure vendors, entered the ESS market attracted by prospects of profit on the one hand, and access to products which were complementary to their existing product range on the other. Consequently, fewer actors were present in this period (from 2006 to 2008) and the diversity of the most important providers decreased. Finally, the market became structured around six leaders, with many other small vendors fighting to win their place. Although these two waves have already contributed to considerable market consolidation, we expect that further acquisitions and mergers will occur, possibly leading to the disappearance of many pure ESS providers. The main reason is that, in the long term, search tools will be increasingly integrated into information management systems, rather

than remaining as stand-alone software modules. At the same time, there are still opportunities for innovative newcomers. The emergence of collaborative tools and their relative success on the enterprise search market is one example of positive collaboration between newcomers which will also have an impact on the business of established actors.

The Pestel model and Porter's five-force analysis adequately explain the observed waves of past mergers and acquisitions in ESS. As regards the prospects, we carried out a SWOT analysis and found that the **opportunities outweigh the threats for solution providers**. In particular, we mention three main opportunities. The first pivots around the emergence of SaaS (Software as a Service) as a technologically reliable and economically convenient solution, acceptable to users, for managing information assets. Second, the unceasing demand for mobile solutions offers an as yet unexploited expansion market for ESS. Finally, the need to comply with current and future regulation (e.g. privacy laws) also offers a window of opportunity for developers of new technology for new applications (e.g. e-discovery tools). On the downside, the current crisis is jeopardizing IT investments and the ESS sector is not immune to this general trend. The crisis may also cause an acceleration of the consolidation effect.

Conclusions

Since the early 2000s, the ESS market has gone through major development phases. While it appears to be less volatile and more consolidated now, it continues to experience strong growth due to an unceasing demand for ESS applications. Technological progress has helped ESS to comply with ever increasing user and business requirements, but technological drivers are, however, unlikely to cause structural changes in the market. In fact, our analysis does not suggest radical or disruptive revolutions in the overall ESS market structure. This is due to the fact that, on the one hand, search tool are already strongly rooted

in information systems and, on the other hand, the major players in software and information services are already active in the ESS market.

ESS is, however, a key technology for enhancing company efficiency and competitiveness. It is also an important market in itself. It can, therefore, be considered a strategic for Europe and worth supporting with policy actions. One option would be to favour the consolidation of existing European ESS actors. Alternatively, technical and business alliances involving major European players could be supported. Such support could include the pooling of resources for R&D on promising technologies. A higher degree of interoperability could also be encouraged, thus reducing barriers to the development of new services and lowering costs for consumers. In addition, support to the development of sub-markets for specific corporate users (small and medium-sized users, not-for-profit organisations – i.e. government, public agencies, etc., or ASPs) could be envisaged, as these markets could provide competitive opportunities for European companies.

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■ Introduction

Rising concepts such as those of a "new economy" or an "e-economy" point to the fact that important economic changes have taken place in recent years, driven by the development and diffusion of new electronic-based information and communication technologies and distributed communication systems. The Internet has had a clear effect on the economy. In fact, Internet tools, while originally developed for academia and governments, have expanded in scope to become accessible and incorporated into everybody's daily lives. They now concern a wide range of social communities and demographic groups. On the business side as well, important transformations have taken place. With new possibilities of quick wealth, entrepreneurs have begun experimenting diverse electronic commerce business models, by adapting conventional sales transactions and by developing untraditional practices, such as providing free content and products in the hopes of securing a sizable market share, as well as structuring virtual organisations to spare fixed costs and to escape geographical and physical constraints.

Such shifts can hardly be analysed as macroeconomic or cyclical phenomena, but instead put forth an ongoing structural transition drawing on technological change, business transformation, activity and content evolution, new regulation and social attitude. This structural transition rests on the emergence of distinctive new forms of business organisation and work, which are shaped by new strategies for developing and deploying innovation, and which give the opportunity to existing companies and outsiders, in a broad range of sectors, to defend and expand their market position. By creating a global network overwhelming most pre-existing gaps between individuals and professionals, between large and small firms, between economic agents involved in different industries, or between citizens in different countries, technological change in the core sectors related to information-processing has actually released a great potential for productivity growth.

As a matter of fact, technological change has also brought up new issues related to the ever-growing amount of digitalized information. Simon (1971) first described this kind of problem when he wrote:

"...in an information-rich world, the wealth of information means a dearth of something else: a scarcity of whatever it is that information consumes. What information consumes is rather obvious: it consumes the attention of its recipients. Hence a wealth of information creates a poverty of attention and a need to allocate that attention efficiently among the overabundance of information sources that might consume it."

The concept of attention in economics underlines the fact that time is a scarce resource and so is the attention of IT users. Abundance of information has become a real dilemma. As a matter of fact, the ability of being oriented and of finding what people are looking for has become a growing source of value. Having an access to relevant information when needed is a requirement that is not sufficiently satisfied. This is apparent both in business-to-consumer and business-to-business contexts.

In the business-to-consumer case, this trend is obvious if we consider the huge amount of information available on the Internet. In the business-to-business case, this trend is well illustrated by the abundance of data on Intranets or by the need for customers to find the right information on commercial websites. Both these phenomena have motivated the development and spreading of Web services, and therefore have had several consequences on supply and demand. On the supply side, we observe the convergence

and creation of an integrated platform, structuring infrastructure to implement operational and business-supporting systems, disconnecting applications from infrastructure, and enabling the development of new local business applications. On the demand side, many organisations now essentially focus on technology and legacy information systems or applications, waiting for returns on investments.

From Web search…

Search engines have become the gatekeepers for information search and dissemination. Most available figures insist, in this context, on the domestic penetration of the Internet and search engines, and not on how search engines are used to support business solutions. In spite of this, these figures remain a first indication of the actual tendencies observed. Consumers are increasingly using the Internet for commercial activities, including shopping, purchasing, travelling, banking and stock trading. Substantial growth is taking place across the entire spectrum of consumer oriented e-commerce categories, with online commerce representing significant shares in several consumer goods categories. In other words, consumers now turn to the Internet for a larger variety of commercial purposes and with greater frequency.[1]

The economics of search engines has played a growing role as the Internet has spread across the globe. As a matter of fact, search engines concern a constantly increasing audience and their industry is expanding beyond telecommunication networks. Recent stylised facts demonstrate the challenge posed by search engines in the Internet economy: 60% of people seeking health-related information consult a search engine; on average, Americans spend 17 minutes a day on *Google*; 40% of online advertising revenue is aimed towards search engines; *Google* captures

95% of European requests on search engines (see Strowel & Triaille, 2008); in June 2008, *Xiti*[2] *found that Google* concentrated almost 91% of all requests in France; and finally, another study found that 43% of the searches performed on a typical day in the US are done on *Google*, with *Yahoo* coming in second with 28% of all searches (Sullivan, 2006).

As van Hoboken (2008)[3] suggests, the search engines form a bottleneck in the online search process. In a digital economy that is increasingly becoming an information and attention-based economy, search engines are occupying a central role. This trend is well illustrated by the symbolic status of *Google* both in terms of its reputation and its domination in Internet traffic.

Economic models and competition structures do not provide a clear understanding of search engines, despite their importance. Because they are based on top-heavy IT infrastructures, they often are considered as part of the network economy. By contrast, because they offer information and service applications, they can also be classified as part of the content economy. Their disruptive success on the Internet can be traced back to the very fact that they support innovations in the technical, service, use and business model spheres simultaneously. This diversity explains why it is so difficult to grasp the search engine phenomenon on a global scale: search engine development raises questions in terms of regulation, economic models and relations with access suppliers.

The most important market segment for search engines is the public generalist domain. In this category, *Google* plays a leading role (most people think of search as just logging onto *Google*). Other search engines however proliferate in this segment. In fact, this market is not the only one and several search engine solutions

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1 Médiamétrie, TNS Sofres. http://www.journaldunet.com/cc/04_ecommerce/ecom_cyberconso_fr.shtml

2 See http://www.vdp-digital.com/articles/view.php/108/moteur-de-recherche-google-cap-91-pourcent

3 See http://www.jorisvanhoboken.nl/?cat=20

exist in other segments. The business segment in particular emerges as an enduring feature of the Internet economy. It offers new tools that can be combined with the assets and capabilities of incumbent firms in order to transform and make business processes more efficient.

… to enterprise search

In the business context, search activity is coined enterprise search. The latter can be described as an attempt to make certain types of content available to authorized employees, partners, or contractors of an organisation.

What is the vacation planning for this summer? How many cars have been sold in 2002? Where is the address of the seminar Mr Jones sent by email? How many delivery trucks are in Milano at this time? Can blue socks be found on the commercial site of this particular clothing shop? All of these questions can be answered thanks to enterprise search tools. We shall show off (cf. table below) that Enterprise Search Solutions turn more and more close to the usual search engines but demonstrate, however, some peculiarities: this explains why they are supporting two different markets.

The Enterprise Search Solution (ESS) market represented almost one billion dollar in 2008 (as suggested by Gartner) and is expected to grow more quickly than the information system market. Firms from all industries and all sizes are concerned. Considering the relative newness of the market, the emergent innovative features it proposes and the need for firms to turn to more adapted tools, the market for ESS appears as profitable. However, except for a couple of consultant reports (such as those of Forrester or Gartner, among others) and few academic papers (such as Hawking,

2004), there is no detailed and consistent analysis of the ESS market, particularly for Europe. It remains, however, a strategic market related to information and knowledge. Hence, understanding its structure, dynamics and opportunities is a key resource for the competitiveness of the European Union.

Search technology is the window to all enterprise information – the search result being merely the first step in a larger information access process. A search and information access system allows an administrator to identify specific content, both internal and external to the enterprise, for it to be indexed, searched, and displayed to authorized users.

Queries are related to various business contexts. The main difficulty with this process is to integrate or to understand the specific context, which can be related to job, industry, market, economic situation, etc. For example, what is similar between the needs of two workers of the same automotive firm looking for one of their recent products, with one from the marketing department, and the other from the engineering department? One needs technical information related to the conception, whereas his colleague needs commercial information related to the evolution of price, statistics of sales, etc. The integration of the context is undoubtedly one of the biggest challenges of enterprise search.

The definition and the scope of Enterprise Search exemplify, therefore, noteworthy characteristics from the technical, economic and organisational viewpoint. They cannot be handled with the traditional way to analyse the web search engine segment. On the contrary, they represent key issues calling for a specific market analysis. As an illustration, Table 1 summarizes the main differences between web search and Enterprise Search.

■ *Table 1: Differences between web search and enterprise search*

	Web Search	Enterprise Search
	Technical features	
Content	Web pages	Web pages + all internal repositories
Format	Homogeneous format : web pages	emails, databases => All formats : both structured and unstructured content
Access	Everybody can access the same content	Access rights needed, security is a strong requirement
Scalability	Web search engines indexe only a small part of the web	All former and new documents must be indexed
Implementation	On the web	Many choices available including Software as a Service
	Economic features	
Market	Only few providers with one same product	Large range of providers and products
Offer	Mass market product	Tailored solutions
Business models of providers	Based on a two sided market. Adverstising is the only source of revenue	Large kind of models. The products can be bundled with other products, sold for itself or clients can suscribe to access the product
	Usages	
Queries	Independent of the context	Context-related
Users	All considered the same	Users are considered as experts

The information economy

Many authors in economics and management underline the complex structure of information and knowledge (Polanyi, 1958; Nonaka, 1990; Nonaka and Takeuchi, 1997; and more recently, Sargis-Roussel, 2002): whether individual or collective, tacit or explicit, or embedded in corresponding organisational and social structures.

Recent developments in economics and management studies have also stressed the key role of knowledge management for industrial performance and creation of value. They stress a radical contextual shift: from the economics of standardization to the economics of creativity, referring to the formulation of new ideas and to the implementation of these ideas in order to produce original works and develop competitive advantage (see Hawking et al, 2005).

The increasing importance of knowledge in society is underlined by a growing number of influential authors from various disciplines (see David & Foray, 2002). Knowledge and access to information are increasingly recognized as powerful engines capable of supporting innovation, driving economic growth and promoting development, in a globalizing world. Many authors have, in fact, argued that such dynamics are only achievable through information-centred organisations. The comprehensive effects of placing knowledge at the core of the development of firms have lead to the concept of "the global knowledge company", which implies a radical transformation in the ways to manage companies in the current global knowledge-based context (see Cohendet & Simon, 2007).

The growing importance of knowledge is apparent in every economic sector. In the medical field, for instance, Agamalian *et al.*

(2002) have argued that "the key to designing effective and efficient processes and to making sound decisions is the availability of high quality, integrated information delivered when and where it is needed, in a manner useful to knowledge workers, decision makers, and healthcare consumers". Still, managers are spending more and more time on their computers searching for information: some even argue that they are turned away from their "real" jobs by new information technologies. As a consequence, organisations are increasingly aware of the role and value of information, which is why they organize the identification, collection, sharing and delivery of information in order to support operational activities and strategic management choices. More and more, operating systems provide tools for data management (such as *Microsoft*'s *SharePoint*, for example), opening gates to local information systems (via the Intranet and specific applications), as well as to the Internet and Extranets. As a consequence, business managers are increasingly dependent upon systems and information technologies for the delivery of that information and knowledge.

According to this perspective, ESS are becoming indispensable tools for businesses of all sizes, by helping people find, use and share critical business information quickly.

Academics have shown little interest in enterprise search, with some notable exceptions (Hawking, 2004). There are some shared aims in comparison to retrieval technologies and their implications. Academics are, however, more focused on Web search engines. Some have written on competition among engines (see, for example, Gallaugher & Downing, 2000; Telang, 2004; Rajan *et al.*, 2004; or Eijk, 2007) or regulation (see Benghozi, 2008); while others are interested in analysing the degree and nature of biases in information retrieval (see, for example, Vaughan & Thelwall, 2004; or Mowshowitz & Kawaguchi, 2005), and more generally Web search business models (see Benghozi & Paris, 2007).

The lack of studies on ESS is somewhat astonishing, since search activities take time in business life and the solution chosen can contribute to improve productivity by allowing people to spend less time looking for the information or the document they need. On the contrary, an inappropriate solution can be counter-productive and drive people to spend more time than necessary looking for information. Considering the importance of data management in businesses, the choice of a search solution implemented in an information system can therefore be considered as a critical, risky and difficult decision. This is even more true, given the many acquisitions that have taken place in the recent years, with the offer regularly changing. There now is a wide variety of search vendors on the market.

Presentation of the report

In this report, we propose an analysis of the ESS market dynamics and the structuring of the offers. We consider all the aspects of enterprise search, including Intranet search, e-commercial site search and internal search. Our main argument is that ESS are at the crossroads of two established markets: the Web search on one hand, and the management of information systems on the other hand. The apparent convergence of these two markets provides a framework to understand the strategies of the various actors, the restructuring of the value chain, and the decision process the users are facing.

The following report is divided into six parts and five appendices.

Part 1 of the document presents a global overview of the market for ESS. Its emergence, dynamics and main formal characteristics are first introduced. The structure and main actors of the field are then outlined. These elements enable us to present the existing industrial forecasts for the ESS market and to discuss its expected future evolution.

Part 2 of this report offers a broad sketch of the technical design of the search process and identifies the main components of its value chain. We present here the competitive dimension of the various components at stake, and show how they shape the structuring, the positioning and differentiation of the various actors. We therefore provide the basis to understand and identify existing competitive trends.

Part 3 of the document is dedicated to the users' viewpoint. We first explore the dynamics and diversity of demand, by insisting on the influence of the industry field and of the specific corporate functionalities. We then present the decision process of the firms, by analysing the main factors and steps of the corporate choice in terms of requirements, decision criteria, decision makers, and economic variables.

In Part 4, we mainly focus on the dynamic trends of the market. As we have suggested, the ESS market has been characterised by successive waves of mergers and acquisitions. We therefore present the major dynamics followed by providers and the evolution of the market structure during various periods.

Part 5 of the report is devoted to three case studies, which enable us to compare the range of possible situations and their contextual differences. We present in particular three different companies, which are all customers of the same provider: the first is a large public R&D organisation who was looking for an enterprise search application, the second firm is a major player in logistics who wished to implement a search-based application, and, finally, the third case is a major estate agency platform who wanted to develop a website search.

In Part 6, we present our main conclusions. We summarize our findings and describe the main perspectives for the ESS market using the SWOT method combined with the Pestel model and Porter's five-forces analysis.

■ Part 1. Enterprise Search Solution Repository

This part of the report presents and provides a general outline of the ESS market. We first introduce the main characteristics of the market and the needs and requirements, which urged its birth and growth. We introduce and comment, in particular, the various data given by analysts in order to stress the main trends of the markets. We then present the main solution providers and give their results in 2007. This allows us to suggest forecasts and trends for the years coming.

1.1. The emergence of the ESS market

To understand the current market, the study of its birth provides important insights.

The market for enterprise search was born in the middle of the nineties when the quantity of digital data started to grow and therefore had to be stored in many repositories. Enterprise content management showed several limits as it was rather difficult to retrieve unstructured and multimedia data. When the ESS market emerged, the following categories of actors could be identified:

- *Specialized actors*, working on semantic or specific development of linguistic and search, thus foreshadowing the recent semantic developments;
- *Pure players*, whose core offer was based on search tools;
- *Suppliers of enterprise content management (ECM) solutions*;
- *Platform vendors*, offering elaborated search tools (such as *Fast* and *Autonomy*);
- *Basic search vendors*, offering basic solutions for limited search needs.

The market became more mature some years later, as new actors emerged and new types of applications and enterprise search tools appeared. These applications and tools widely contributed to restructure the market. Among the newcomers, the more significant ones were:

- Vendors offering turnkey solutions;
- Vendors offering specific appliances.

Infrastructure vendors also started to offer embedded tools, and began considering acquisitions in order to expand their offers and complete their product range.

The birth and the development of the market echos the difficulties workers expressed in many surveys.

- *Accenture* surveyed 1500 managers in US and UK companies in late 2006, and concluded that "Managers spend more than a quarter of their time searching for information necessary to their jobs, and when they do find it, it is often wrong. […] Managers spend up to two hours a day searching for information, and more than 50 percent of the information they obtain has no value to them."[4]

- *Capgemini* surveyed 150 managers in large UK organisations in late 2007. According to this survey, 63% of the respondents made business-critical decisions five times or more a week without the right information. Executives felt that there was a potential to increase business performance by 29% with a more effective exploitation of information. In the UK, these figures would imply a loss of $140 billion a year.[5] Although unrealistic, these statistics reveal the potential importance of the sector.

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4 Source: http://www.accenture.com/countries/UK, Press release, 4th January 2007.
5 Source: http://www.uk.capgemini.com/news/pr/pr1605

Figure 1: Breakdown of a knowledge worker's time
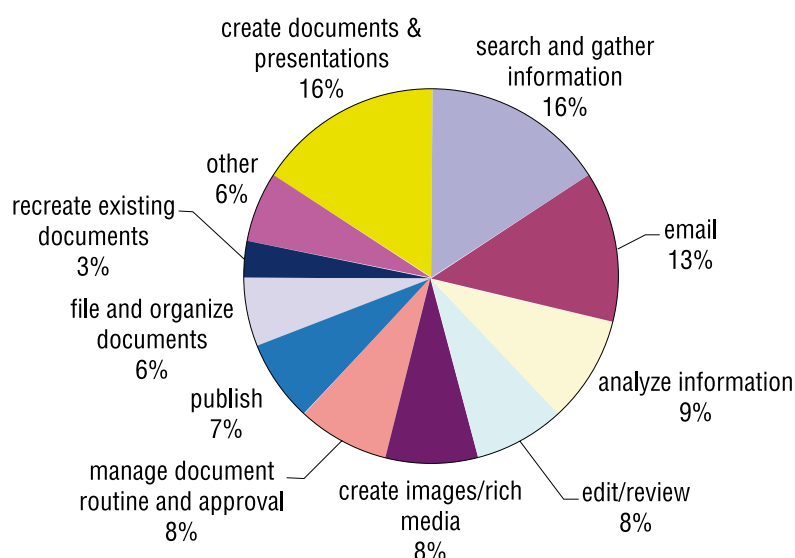
Source: IDC data[6].

- *IDC* proposes a breakdown of knowledge workers' time in which search and information gathering takes up 16% of their time. Moreover, knowledge workers spend 3% of their time recreating existing information. These figures underline the potential productivity gains, which could exist with the implementation of an efficient search solution.

Because of the wide range of industrial sectors and organisations of labour, the various industrial reports (undertaken by IDC, Forrester, or Gartner, among others) do not always present the exact same figures.[7] However, all analysts agree to say that workers, and especially knowledge workers, spend too much time searching for information or recreating existing information. This time could be allocated to productive activities, such as creating content or analysing information.

At the crossroads of information technology, telecommunications, marketing, featured industries,

organisational life and management practices, the ESS marketplace is not monolithic in its requirements. Since the beginning, the diversity of demands concerning search technologies has been a disincentive for vendors to focus on distinct niches. And yet, this trend seems to be shifting, especially with "all the large software companies now seriously announcing products in the enterprise search market".[8]

1.1.1. The description of enterprise search companies

In this section, we identify and portray the most significant ESS providers thanks to a detailed analysis of the leading specific actors, namely *Autonomy*, *Fast* and *Exalead*. A more detailed and comprehensive description of the main actors of the ESS market is given in Appendix 1.

To begin, we focus on the ecosystem formed by the various actors of different sizes. The first main feature of this market relates to its competitive structure, which can be associated to an oligopoly with a broad fringe. We

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6 For additional information, see http://factiva.com/collateral/ files/whitepaper_IDC_hiddencosts_0405.pdf

7 In the previous graph, we selected the *IDC* analysis, because its methodology is more rigorous and detailed.

8 Source: http://gilbane.com/search_blog/2007/12/

characterise, in particular, the role of the fringe (with innovation and niche markets).

Several categories of providers were distinguished. The first category is composed of the very big actors. They have turnovers of a few hundred million euros and offer high quality products (*Autonomy* lies in this category). The second category of providers consists of significant actors with turnovers higher than €100 million, and providing a large search product range (*Fast* and *Endeca* illustrate this trend). The third category of actors is made up of middle-size actors with a turnover between €5 million and €100 million, which are quickly growing (*Exalead* is a good example for this category). Finally, we identified a multitude of small actors with a turnover below €5 million, quickly growing and offering a variety of search tools (this is the case with *Recommind*).

We built the Table 2 to present and recall the turnovers over time of a selection of providers illustrative of the various categories.[9]

1.1.2. The market concentration

Identifying the dominant actors and their market power can help us characterise the market structure. Such characterisation remains, however, at a very broad level. In order to have a more formal assessment of the market concentration, it seems necessary to have a quantitative estimation of the market share of the leading actors. Accordingly, we propose to use the C(4) index, which is commonly used by the French Institute for Economic Studies and Statistics (*INSEE*).[10] In technical terms, the C(4) index represents the share of industry sales accounted for by the four largest firms.

For methodological reason, we restrained the investigated market to the one formed by pure players. The turnovers generated by enterprise search for the other types of providers has been difficult to set up and did not provide consistent data.

To construct the index for the pure players' market, we have added the turnovers of the four most important firms of the sector in order to examine what part of the total market the latter actually represent. We propose to use the 2007 figures we collected,[11] divided by the total turnover of the market given by Gartner. As the figures given by Gartner may be over-evaluated, the concentration ratio we obtain is clearly under-estimated.

$$[\text{T2007 } (Autonomy) + \text{T2007 } (Fast) + \text{T2007 } (Endeca) + \text{T2007 } (Inquira)] / \text{T2007 (sector)}$$

$$[251{,}810{,}196 + 143{,}000{,}000 + 100{,}000{,}000 + 27{,}400{,}000] / [861{,}000{,}000*0.739754^{12}]$$

$$= 81.98 \%$$

In comparison to the value of the C(4) index obtained in other industrial sectors, this percentage suggests that the market shares are very much concentrated on the most important providers (see Tables 3 and 4). In fact, Genthon (2004) has provided interesting comparative data, demonstrating that the very high level of concentration in enterprise search markets clearly contrasts with other industries.

Despite these significant results, we must however consider carefully the importance of such estimation, as it does not provide all the details concerning the ESS market structure. For example, it does not take into account the existence of a myriad of little firms providing more specialized tools or working on research and development aspects and collaborating with the leaders through partnerships.

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9   We can point out some pieces of information regarding some of the following actors:
-   Autonomy started its activity providing content management and business intelligence tools;
-   Fast has been acquired by Microsoft in 2008 for $840 million;
-   Opentext is now a leader in content management, while search was its first activity.
10 Source: http://www.persee.fr/web/revues/home/prescript/article/estat_0336-1454_1974_num_60_1_1673

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11 Presented in euros.
12 The number 0.739754 represents the average conversion rate between dollars and euros.

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Table 2: Selected providers, their turnover and their number of employees

Provider	Metric	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998
Autonomy	Turnover (GBP)		172 316 000	128 082 000	56 081 000	35 337 000	33 465 000	24 093 000	26 521 000	44 496 000	16 511 000	5 304 000
	Turnover (EUR)		251 810 196	187 905 260	82 011 172	52 090 236	48 405 563	54 102 309	56 992 810	69 503 286	23 183 095	7 416 360
	Growth		34.54%	128.39%	58.70%	5.59%	-1.58%	-6.89%	-17.92%	169.49%	211.29%	
	Employees		1 131	903	318	219	211	207	304	167	93	41
	Growth		25%	184%	45%	4%	2%	1%	23%	80%	127%	
Fast	Turnover (NOK)		143 000 000			199 815 000	151 047 000	178 089 000	179 643 000	33 722 000	192222000	
	Turnover (EUR)			162 290 000	103 000 000	22 321 933	16 873 914	19 894 856	20 068 458	3 767 186	2 147 347	
	Growth		-11.84%	57.48%	non significant	32.29%	-15.18%	-0.87%	432.72%	75.43%		
	Employees					203		97	133	89	40	
Endeca	Turnover (GBP)		100 000 000									
	Turnover (EUR)											
	Growth											
	Employees		540			7						
Inquira	Turnover (USD)		37 500 000	30 000 000	20 000 000							
	Turnover (EUR)		27 400 659	23 911 800	16 094 900							
	Growth		25.00%	50.00%								
	Employees											
Exalead	Turnover (EUR)		6 038 000	3 528 000	2 703 000	1 491 000	1 052 000	941 000	676 000			
	Growth		127.83%	30.52%	92.93%	33.17%	11.80%	39.20%				
	Employees		82	47	35	21	19	17	n.a			
	Growth		74.47%	34.29%	66.67%	10.53%	11.76%					
Sinequa	Turnover (EUR)	5 234 048	3 434 146	2 151 602	1 593 639	1 709 543	1 559 236					
	Growth	52.41%	59.61%	35.01%	-6.78%	10.28%						
	Employees	17	n.a	17	18	18	15					
Recommind	Turnover (USD)		3 900 000	n.a	2 000 000	1 800 000	1 800 000	1 750 000				
	Turnover (EUR)		2 849 668									
	Growth			n.a	11.11%	0.00%	2.86%					
	Employees		40		22	22	22	22				
Dieselpoint	Turnover (USD)		630 000									
	Turnover (EUR)		460 331									
	Growth											
	Employees		8									
Dtsearch	Turnover (USD)		220 000									
	Turnover (EUR)		160 750									
	Growth											
	Employees											
Opentext	Turnover (USD)	725 500 000	595 700 000									
	Turnover (EUR)	465 906 094										
	Growth	-16.75%										
	Employees	3000	2 704									

Legend:
- Turnover > €200 millions
- Turnover between €100 and 200
- Turnover between €5 and 100 millions
- Turnover < €5 millions
- Unconsolidated data

■ Table 3:   Values of C(n) indexes in the car industry

	1993	1996	1999	2002
C1	0,15	0,14	0,15	0,14
C4	0,45	0,44	0,45	0,45
C8	0,64	0,64	0,67	0,68

■ Table 4:   Values of C(n) indexes in the computer industry

	1983	1986	1989
C1	0,37	0,32	0,27
C4	0,49	0,47	0,43
C8	0,46	0,65	0,62

Only a detailed analysis can thoroughly portray the entire market structure.

1.2. Enterprise search providers' data

Considering the fact that many actors do not solely provide search products, it appears difficult to determine the share of their revenue coming from enterprise search. In most cases, enterprise search is a secondary source of revenue and results from a diversification strategy. These firms come from software edition or IS management and services. Pure players (or enterprise search focused players) dominate the ESS market. As we demonstrated above, the concentration index is very high for such a category of providers. These companies represent more than 84% of the market if we consider only the nine most influent actors. For these reasons, we decided to focus our individual numerical analysis on pure players, before giving a detailed analysis of three different firms belonging to this group. Pure players are more likely to be exposed to the changes and the evolutions of the ESS market that could occur in the coming years, but they are also the most reactive and innovative firms in this market.

1.2.1. The market structure

Our research suggests that the sub-market formed by pure players inside the market for enterprise search providers is very heterogeneous: it encompasses many various firms in terms of turnover, with a large number of active employees. In fact, the market is uneven. The full range of companies spans from the large-sized and powerful firm *Autonomy*, to the tiny firm *Dieselpoint*, which has only eight employees and had a €460,000 turnover in 2007. The coexistence of many firms of different sizes is an indicator that the market is not yet consolidated. Acquisitions and mergers are likely to take place in the coming years, at the expense of pure players. The current financial situation of several firms should strengthen this trend. As a consequence, it is important to specify the various situations of firms and the dynamics occurring in this ecosystem.

From a methodological point of view, we collected the following figures in the *Amadeus* database[13] (for European firms), in the *Diane* database[14] (for French firms), in the *Fame* database[15] (for English firms) and in the *Orbis* database[16] (worldwide). In addition, we used annual reports, press releases or interviews of CEOs published on the Web. The main difficulty

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13 Source: https://amadeus.bvdep.com/version-2009529/cgi/template.dll?product=2
14 Source: https://diane.bvdep.com/version-2009330/cgi/template.dll?product=8
15 Source: https://fame.bvdep.com/version-200963/cgi/template.dll
16 Source: https://orbis.bvdep.com/version-2009512/cgi/template.dll?product=13

was to obtain the consolidated figures. As these firms may have subsidiary companies abroad, we favoured the consolidated data whenever it was possible. However, most of the databases produce unconsolidated data. In such cases, we completed our dataset with the available information. We still should underline the fact that these figures are imprecise and must only be used as indications. In our database, the unconsolidated figures are in grey cells.

Our study focuses on the year 2007 (see Table 5), because all the figures for 2008 were not available. Furthermore, we only analysed the most representative companies, in terms of strategy and marketing positioning. In short, this analysis confirms the diversity of possible situations and the existence of an ecosystem made of very powerful firms (with a turnover higher than €250 millions) and very little firms (with a turnover lower than €1 million). Accordingly, we split our sample into four categories which refer to the different types of firms we previously mentioned. We distinguish the firms with a turnover of a few hundred million euros, the firms with a turnover between €100 and €200 million, the firms with a turnover between €5 and €100 million, and finally the firms with a turnover below €5 million.

The figure displays the heterogeneity of situations observed. One firm, namely *Autonomy,* represents almost half of the total generated

revenue. The others have an intermediary position or are almost insignificant in terms of turnover. These results confirm the fact that the ESS market can be seen as a fringe oligopoly, where a few major providers dominate the market, and the rest of the market consists in a large number of small companies.

As this is the case in other industrial sector, the fringe of the oligopoly has two major roles. The first one is to favour innovation in the industrial ecosystem through the dynamics of symbiotic relations. Small and medium-sized firms usually explore innovative solutions that are then acquired and developed by larger companies. In our case, most of the providers studied are actually involved in partnerships. These partnerships link big firms, developing solutions for the mass market, to smaller firms, working on innovative aspects of the solutions provided. The second distinctive role of the oligopoly fringe is to provide solutions for niche markets. This is especially the case in the ESS market with emerging trends such as e-discovery and compliance. These trends are now starting to spread among the biggest providers.

1.2.2. Three representative actors

To give an account of the structure of this type of market, we decided to analyse three providers in different positions, namely:

▩ *Table 5:   ESS providers' turnover in 2007 (in million euros)*

1	Autonomy	251,8
2	Fast Endeca	143 100
3	Inquira Exalead	27,4 8,03
4	Sinequa Recomind DieselPoint DtSearch	3,43 2,85 0,46 0,16
	TOTAL	**537,13**

- *Autonomy* the dominant player of the market;
- *Fast*, which was in an intermediate situation before being acquired;
- *Exalead*, which is the growing provider, but remains modest in terms of turnover in comparison to *Autonomy*.

These three firms are illustrative of the situation of pure players on the ESS market, as they represent the various sizes of firms operating in this market. One of them (namely *Fast*) has recently been acquired, which is interesting given that this phenomenon could affect many firms in the future.

The specific analysis of these providers over time can help us suggest different conjectures for the future evolution of the main actors and the potential structuring of the market.

1.2.2.1. Autonomy

Autonomy is a major actor of the ESS market due to its financial power and an extensive offer, which includes almost all of the hot tendencies we will study in the prospective part.

Autonomy, which was founded out of pioneering research at Cambridge University (UK), is a strategic actor in the field of enterprise search as it is considered one of the most important leaders. It is interesting to note that the evolution of its growth rate has followed the global economic situation of the sector during the period we consider. The company has, in fact, been a successful start-up in the golden age of the Internet.

In 2001, *Autonomy* was affected by the Internet crisis and its future was challenged. However, the firm survived, by focusing on R&D and by developing new innovations. The firm kept its original business model based on R&D, with its primary technology stemming from the research conducted at Cambridge University. In 2007, *Autonomy* earned more than €250 million with a growth rate of almost 35%. The number of employees followed the growth trend. It also means that all new resources created new sources of value. The growth rate is expected to rise in 2008 and 2009, with *Autonomy*'s recent acquisitions (*Autonomy* bought *Interwoven* in 2009). If we consider the usual way technological

Figure 2: Autonomy from 1998 to 2007
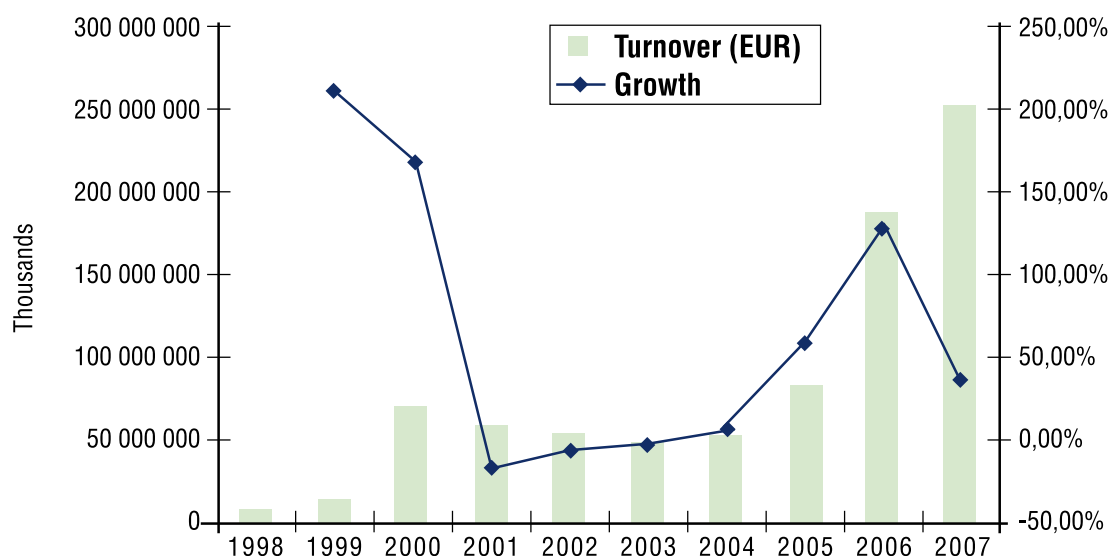
Figure 3:   Fast from 1999 to 2007
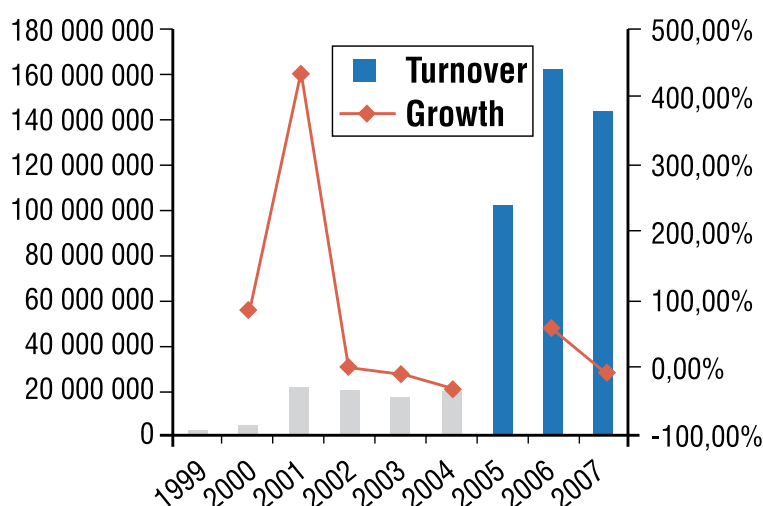
firms and start-ups evolve, the growth rate should nevertheless stabilize in time. Today, if we consider the growing funds and the growing net value of the firm, *Autonomy* seems strong enough to survive the economic crisis.

1.2.2.2. Fast

Until 2008, *Fast* was one of the leading firms in the field of enterprise search. The company was, however, acquired by one of the major software editors. This illustrates how outsiders of the ESS sector can position themselves on the market through the acquisition of major players.

Created in 1997, *Fast* made its first benefits in 2003 thanks to the acquisition of *Alta Vista ES*. Despite its multiple acquisitions, the firm remained very wealthy and profitable until 2004. It only had debts to its shareholders. The EBITDA has constantly grown (except in 2003, the year of *Alta Vista*'s acquisition). Surprisingly, the situation worsened in 2007. The turnover declined (with a decrease of 11.84%), and the operating income became negative (with a decrease of 439%). As a result, the firm went through significant losses, with its financial costs growing quickly due to its growing debt.

The company's number of clients was very high and *Fast* was considered as a reference in the field of enterprise search before its

acquisition. In fact, given that the company was probably under-evaluated, it certainly became a strategic acquisition for *Microsoft*, not only to improve the *SharePoint* search, but also to develop an alternative offer for enterprises as well as to become an enterprise search leader.

Today, *Fast* still remains independent in terms of production (it is still located in Norway), but its financial analysis has become much more sensitive because there is no information concerning the share it represents in *Microsoft*'s turnover.

1.2.2.3. Exalead

Exalead is one of the leaders in enterprise search and one of the strongest actors in Europe.

The firm has always grown since its creation and has never had negative growth rates. Between 2006 and 2007, the firm doubled its turnover and opened offices worldwide. With more than €8 million of turnover in 2007, the firm appears to be very powerful in France, but remains small on an international level, in comparison to the international giants offering search products for enterprises. The company, however, has continued its development with an international strategy and a strong will to stay one of the dominating firms in enterprise search in France, where the majority of its

Figure 4:   Exalead from 2001 to 2007
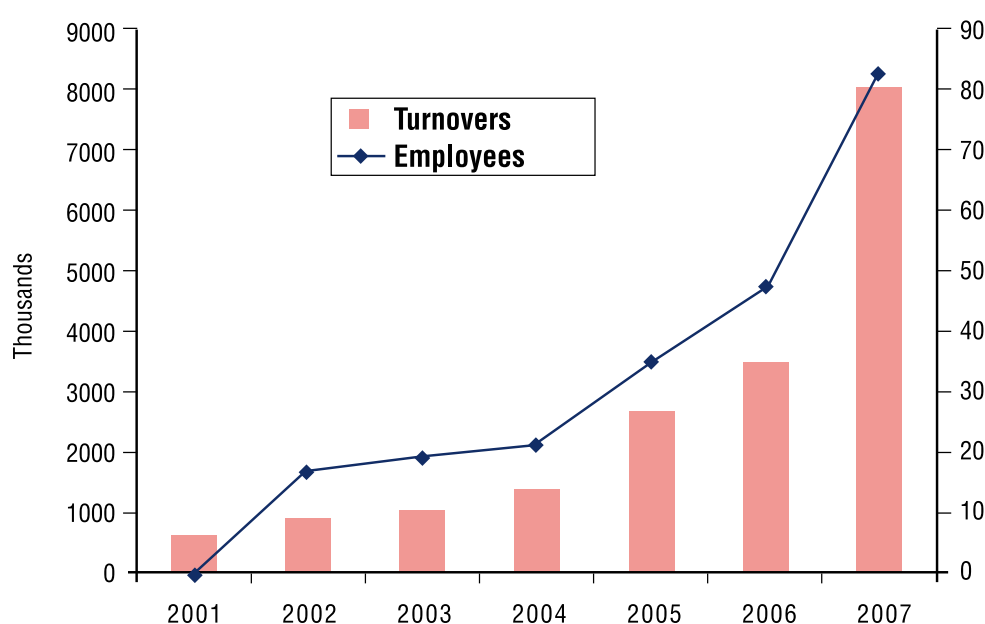
activity is done. To this day, *Exalead* is still part of the oligopoly fringe we previously described.

Considering the strategic path of the company and the competitive dynamic of its environment, two contrasting scenarios may be expected in the future. The first one would be an acquisition, similar to the one faced by *Fast*. Major actors of information systems may be willing to develop or reinforce their activity in the field of enterprise search, and could approach *Exalead* to pool resources together and benefit from the firm's specific competency in search engines. The second scenario assumes that the firm could consolidate its growth thanks to its international development. It could then become one of the next leading firms in the coming years and could, as a result, acquire niche players in the semantic field, for example.

This firm will be extensively analysed in the case study part.

1.3. Enterprise search market data

1.3.1. Market tendency and prospective

1.3.1.1. Existing forecasts

The following figures provided by *Markess International* and Gartner assume that all the fields related to enterprise information management will grow in the years coming. The ESS market is part of a more global market, namely the enterprise information management market. According to *Markess International*, the enterprise information management market should reach €2.42 billion in 2010 as compared to €1.94 billion in 2008.

More specifically, Gartner (2008) foresees that the enterprise search total software revenue should reach $990 million in 2008 and $1500 million in 2012. However, if this market is expected to develop, its growth should slow down to low double-digit percentages, partly because of the continuous downward pressure on license prices and market consolidation.

Table 6:   *Enterprise search total software revenue*

		In million dollars	growth
Enterprise search total software revenue	2006	717	
	2007	861	20%
	2008*	990	15%
	2009*	1109	12%
	2010*	1219	10%
	2012*	1500	11%

* Forecasts
Source: Gartner, 2008.

Figure 5:   *Forecasts versus real market data*
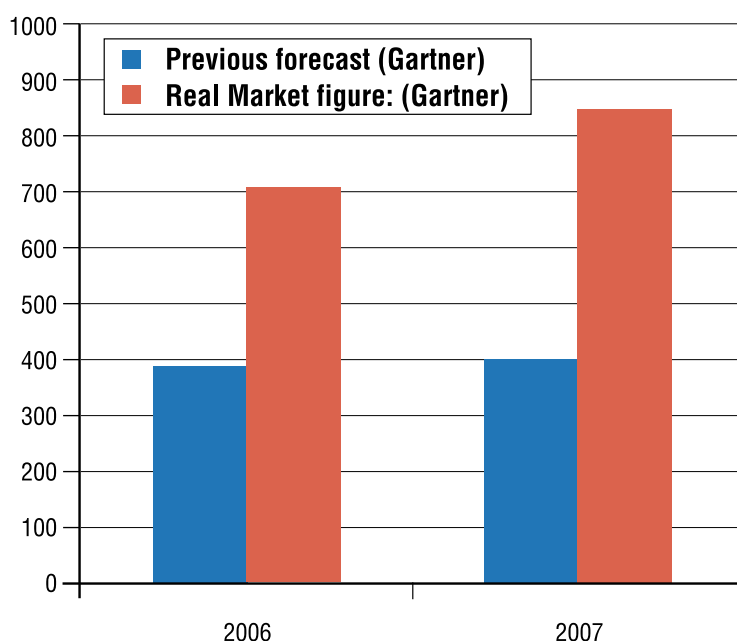
Source: Gartner's ESS market.

These figures must be taken carefully into account as they have varied a lot between 2006 and 2008, and have been established before the recent crisis emerged. Indeed, the crisis' impact on the search providers is still unknown. While some economic actors argue the crisis resulted to suspend many projects, all the people we interviewed declared that they are not affected yet and should not be.

In recent years, the enterprise search market was clearly undervalued if we compare the previous forecasts with the real figures of the market provided by Gartner.

These figures clearly suggest that the market has gone through significant upheaval between 2006 and 2008, thanks to the emergence of new trends. We presuppose, however, that the emergent trends, which influenced the market in 2006 and 2007, drove forecasters to be too optimistic for the next five years. In fact, the development of compliance, the emerging needs in electronic discovery[17] and the expansion of Web 2.0 seem to

17 Electronic discovery (or e-discovery) refers to the use of electronic documents during the pre-trial phase of a lawsuit in which each party through the law of civil procedure can request documents. The concept resulted, in particular, from a debate originated in USA in 2000 and culminated with amendments of the Supreme Court to the US Federal Rules of Civil Procedure

have been part of these trends, which have led to the booming of the market. This will be studied in the part dedicated to emerging trends.

1.3.1.2. Comparison between existing forecasts and collected figures

Considering the previous account, it sounds more realistic to base the analysis on the 2008 figures rather than the forecasts for the following years. Our own collected figures tend to confirm this tendency. If we add the turnovers we found in 2007, see Table 5, for the nine most influent enterprise search pure player providers (excluding *Opentext*, which is more focused on content management), we have a global turnover of about €537,000,000[18] that can be compared to the €631,000,000 found previously (or $861,000,000 dollars set by Gartner, if we consider the average conversion rate in 2007).

1.3.2. Anticipating the market growth

In order to have a more precise account of the actual growth rates, and in order to adopt a dynamic view, we chose to analyse more specifically the growth rates of four different providers, which each belong to the four previously defined categories of providers. Our aim is to account for the different situations of the main providers and to present a global view of the market dynamics. We compare the growth rate of a very big enterprise search pure player (namely *Autonomy*), another big player (namely *Fast*), a middle-size player (namely *Exalead*) and a small player (namely *Sinequa*) (see Figure 6).

Apart from *Fast*, which faced some difficulties in 2007 before being acquired by *Microsoft*, all the providers presented above had an attractive growth rate of more than 45% in 2007. However, we must compare this percentage with the

Figure 6: Growth rate comparison

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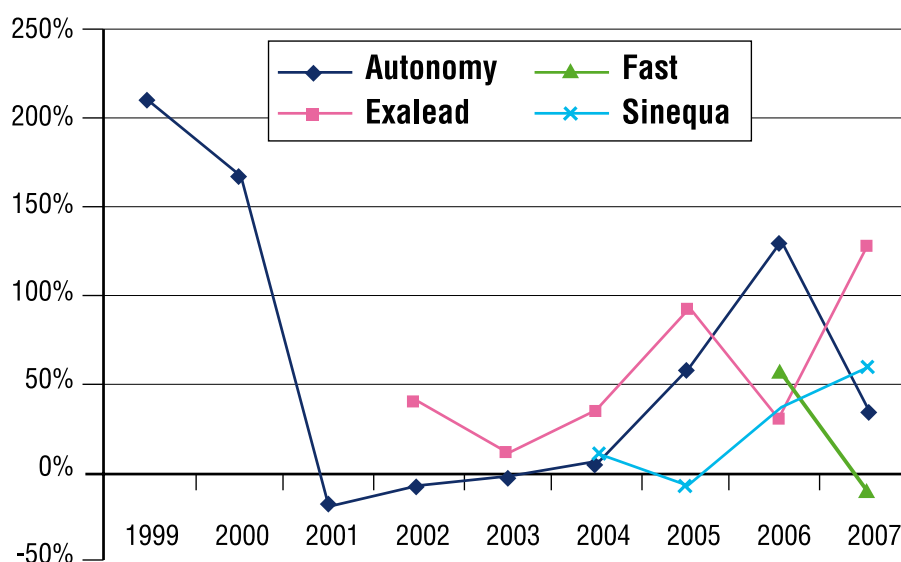
18 This comparison seems rational if we consider the other search specialists (smaller in terms of size and turnover), and others players, such as infrastructure providers, turnkey solutions, etc.

Figure 7:   Market growth comparison
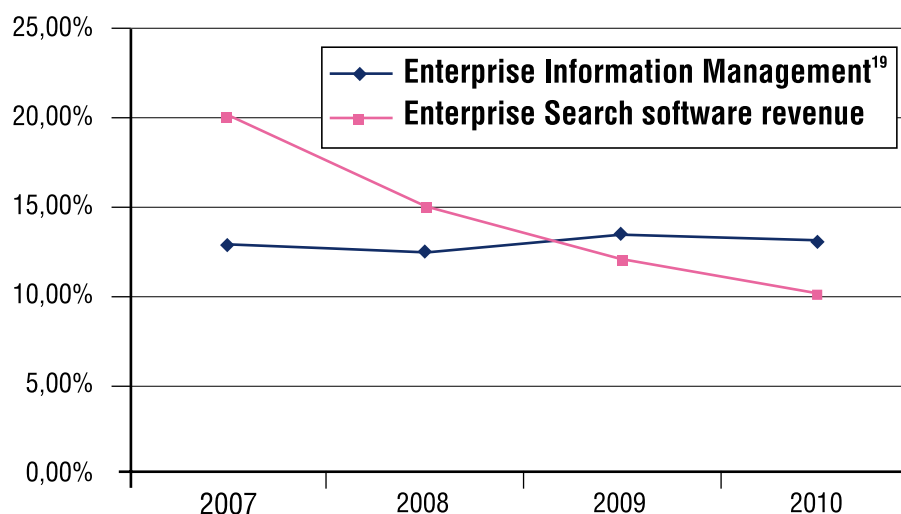
actual turnovers, given that the performance of *Autonomy*, with a 45% growth rate and a turnover of €187.9 million in 2006, has had a much greater impact than the 50% growth rate of *Sinequa*, whose turnover was only €3.43 million.

The figures epitomize a very attractive and still expanding market, as more and more firms express the need to acquire a search solution. As a result, the ESS market has gone through many acquisitions in the past few years (see the part on trends), which is why its features should be modified in the years coming. If we consider the relative newness of the market, the previous growth rates as well as the usual curves of growth for new technology markets, we can assume that the coming growth rates for the ESS market should stay much higher than the growth rates of national GDP.

These trends are confirmed if we consider the dynamics of Enterprise Information Management (EIM). It seems that this market will develop slower than the ESS market until the end of 2008, and that this slowing down in the ESS market (or

a less probable boom in Business Intelligence (BI) and Enterprise Content Management (ECM) markets) will revert this trend. This suggests that the ESS market is not consolidated yet and should stabilize in the coming years (see Figure 7).

Predictions are very sensitive, as many providers are not only providing search tools, but also infrastructure or BI tools. This is implicitly the scenario favoured by the various forecasters, given that, in 2010, the ESS market growth rate should be lower than the EIM market growth rate. This implies that EIM growth could be favoured by a more important growth of BI and content management as compared to information access (which includes enterprise search).

Moreover, even if most of the actors we met appear optimistic and assume that the crisis will not impact their business, it seems that all fields, including enterprise search, will suffer from the consequences of bankruptcies and budget cuts. Thus, the expected span of growth rates given by forecasters must be considered as the highest range of expectations, unless the emerging collaborative tools and new emerging trends renew the needs and the intentions of buying. In spite of all of this, these growth rates remain important if we consider the

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19 Enterprise information management contains BI, content management and information access.

Figure 8:   Growth rate of computer activities (software and services)
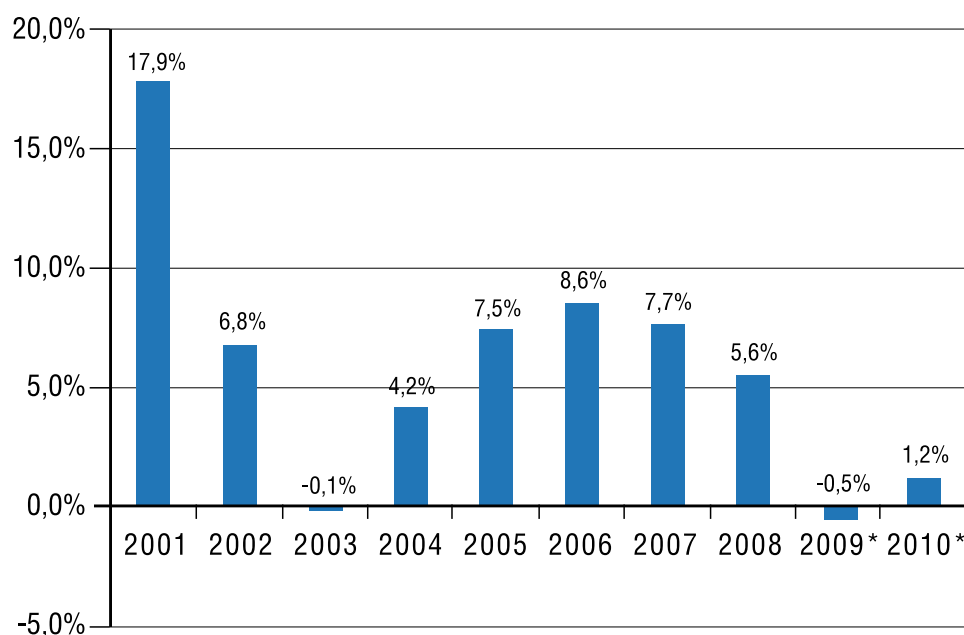
*forecasts
Source: Xerfi based on data from INSEE

expected growth rate for computer activities. French INSEE forecasts a decrease in growth for 2009 and only 1.2% growth for 2010 (see Figure 8).

A second explanation to the shift from ESS to EIM may be given by the tendency towards higher integration and globalisation of the information system market. Such a trend could drive to artificially lower the growth of enterprise search by including it in more integrated activities and markets. The integration and merger between ESS and Information System (IS) is actually one of the hypothesis and scenario we should consider. From a methodological point of view, the consequences of this scenario could be to deeply lower the expectations for the independent ESS market. In fact, whatever the case, enterprise search should still remain an attractive market, if we consider growth rates in the software market, which reached 6.3% in 2006 and 5% in 2007 (according to *IDC*).

1.3.3.   A European situation: the French ESS market

In order to have a European perspective, it seemed interesting to focus on a specific national market, the French market. The French market is interesting for various reasons. Firstly, by its size and the existence of large industrial users of any kind, it constitutes an important market for the various international providers. Secondly, its structure appears to be quite representative of the global market: a myriad of small specialised providers co-exists with some large generalist providers. On the other hand, the French market has nevertheless some limiting characteristics: the market power of the national leader remains frail compared to the leaders of the global industry. Despite such limits, the specific analysis of a national market give the opportunity to grasp and distinguish more easily, on a reduced scale, the weight of ESS compared to other industrial software segments.

In order to develop the national market analysis, we used the French real figures of growth for the different markets partly constituting the EIM market. The data was provided by the SerdaLab analysts (see Figure 9).

Figures 8 and 9 show that the French ESS market is particularly dynamic with its 45.8%

Figure 9:   French Markets in 2007
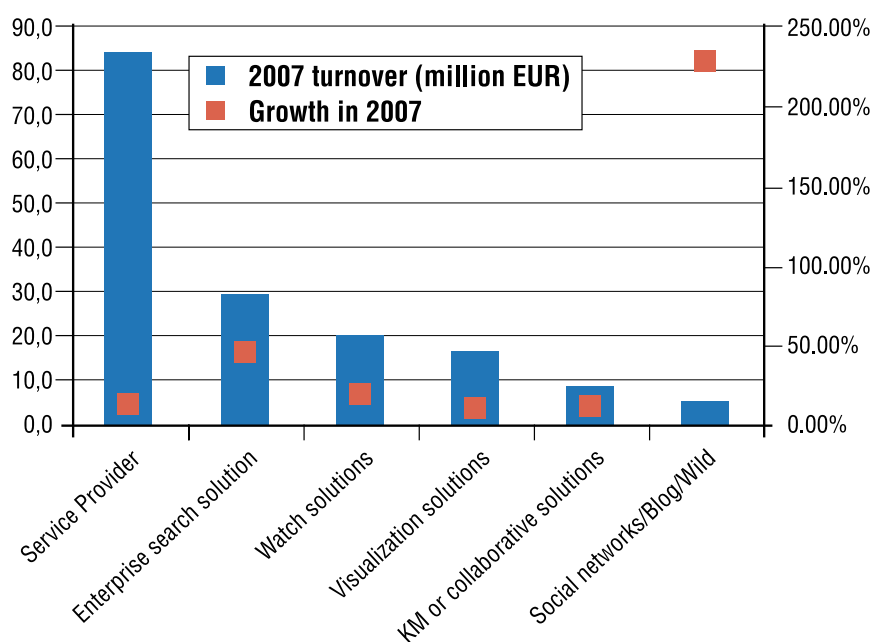
Source: SerdaLab data.

growth rate, which can be compared to the global growth rate of 20% we identified earlier. In spite of this, with €28.9 million national turnover, the French market only represents 4.6% of the international ESS market. This situation confirms the relative domination of the American market in the various solutions provided. We insist on these differences in the following part. If the position of a European country like France is relatively weak in the worldwide market, it should be considered as a strong one amongst other European suppliers. In fact, France is an active player on the European segment, in particular thanks to the presence of *Exalead*, which now offers its products and services in many European countries.

Conclusion

The analysis of the range of various actors (in terms of turnover) has led us to identify different kinds of situations and different expected evolutions.

We first studied the major provider on the ESS market, characterised by high turnover, high market shares (around 15%) and high market power. Its positioning could change in the coming year, as its main activity could apply to information management. We also studied the case of an important provider, which has been recently acquired by a main competitor. It exemplifies the features of an intermediate player in terms of turnover and the characteristics of a big recently acquired firm. Finally, we described the characteristics of one of the European leaders of this market. It is a growing firm, which could become a major provider or could be acquired in the years coming.

The analysis of the market drove us to make optimistic forecasts of the market size representing more than $1,200 million in 2010. The market growth should however slow down and stabilize around 10% a year in 2010. Furthermore, we noticed that the market is not consolidated yet and we expect a high probability of coming acquisitions, which could deeply modify the entire market structure. The expected impact of the crisis could also deeply influence the market structure and its growth for the coming years.

The next question we raise is related to the potential new competition in the evolution of the ESS market. In fact, competition may follow two alternative paths in the future. On one hand, the competition may be led by pure players, which could invade close markets (such as ECM or even BI). On the other hand, the market could be more and more driven by outsiders coming from other IS markets, such as Web search, BI, or ECM. In both these cases, this will entail a reconfiguration of the market design.

The extensive analysis of the enterprise search value chain will help us evaluate the different possible alternatives, as well as portray the current market design.

■ Part 2. Enterprise Search Experience

The first part of the report helped us figure out the structuring of the market and the main actors of this field. In this second part, we aim to present a comprehensive description of the technical building of the search process: how the main components contribute to build up the core competencies and positioning of economic actors? And to what extent do they put together the typology of various providers and the global offering?

2.1. The enterprise search value chain

In the previous part, we observed that the specific positioning of the various actors in the IS market was a key factor in the structuring and evolution of competition. Yet, each actor may handle and control specific competencies and strategic resources according to his position in the global process of search service production.

For this reason, we identify the main segments and processes shared in the ESS production and the particular arrangement corresponding to each solution according to its price, its technical features and the search requirements of targeted users. Following this point of view, we focus on the concept of value chain to convey the enterprise search process.

2.1.1. The search process

The search process requires several steps from crawling to reporting and analytics. All these steps are independent and proposed by the providers to fulfil the demand. This process can be summarized throughout the concept of value chain. Porter (1985) first introduced the value chain concept in order to analyze the origins of competitive advantage. The value chain is originally a chain of following activities creating more value together than when separated. The difference between the

Figure 10: Value chain of the search process
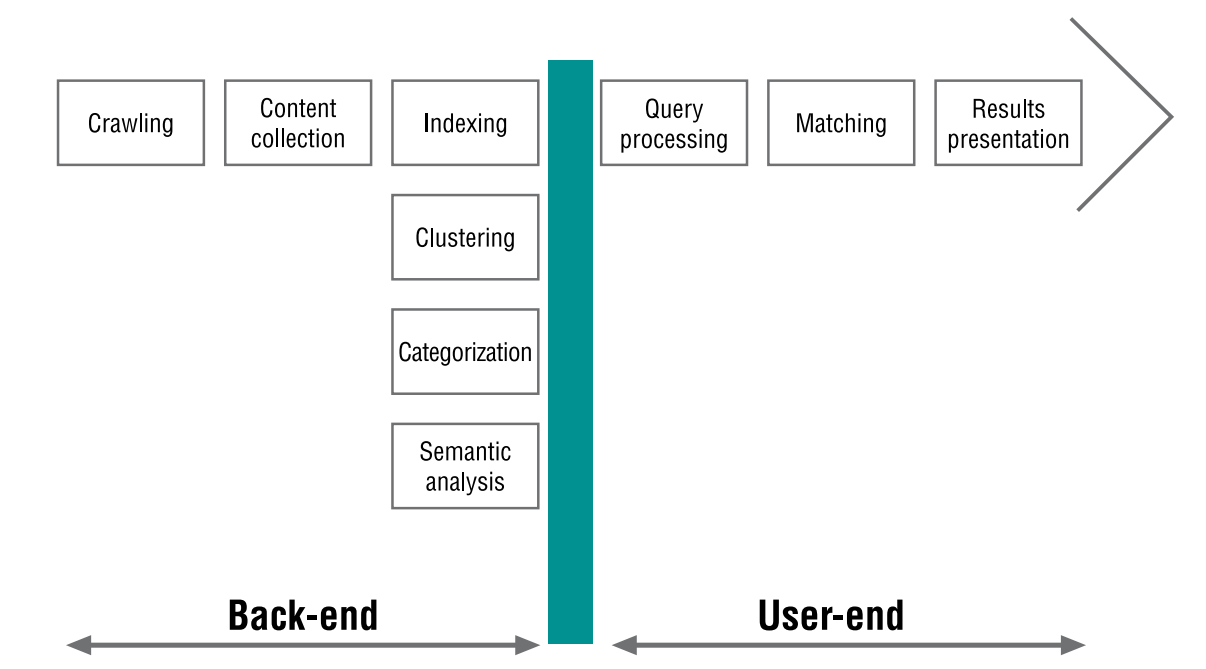
created value and the cost of all activities is the margin created by the process. The value chain concept has been extended and is now often used to describe processes and activities generating value. The concept seems relevant to present a comprehensive framework of the process of search and to specify the most valuable steps for users in a professional context. Indeed, it shows the many technical steps that occur before the end users make their requests. This type of analysis derives from a technical logic that is essential to observe and comment the changes in the market supply and the evolutions of uses.

The main process represents the major steps guaranteeing that the search experience will perform well. These steps form essential blocks inside the process: this is the case for crawling or indexing, which has existed since the origins of automatic search processes. These steps can also be the product of research and improvements: this is the case for clustering or categorisation, which are progressively becoming more and more important and decisive to improve the search experience. For example, we cannot imagine a search solution built with no content collection, or no index process, as this would cancel out the efficiency of the entire search process.

2.1.2. The components of the search value chain

Considering the aspects the providers communicate on and the requirements expressed by clients, we argue that practices have changed and new priorities have now emerged, redefining the pre-eminence of certain elements of the value chain.

2.1.2.1. The essential blocks of ESS

We distinguish here the parts of the process the users favour in their day-to-day business life, or the parts they are focused on when they have to choose and buy a solution. These are the parts of the process, which structure the performances the end users are sensitive to. In other words, they have value for end users. These main parts of the process are the following:

- *Clustering, categorisation and semantic analysis:* these parts of the search process have become fundamental and most solutions include them. They make the search experience more often successful, by focusing on the meaning of the words and the relations between terms, sometimes related to a specific job. It is important to note that the quality of these steps is highly dependent on the quality of the indexing part.

- *Query processing:* this part of the process is critical given that keyword search is not always efficient in a business context. Words have different meanings according to job position. For example, the name of a product refers to many different requests depending on the department of origin. A marketing employee would search for the latest promotion campaign, while the design department employee would rather search for the technical features of the product. The need for context information is very strong in these cases. With business-to-consumer search engines, ESS have specific features: similar documents may be updated very frequently, and the information and data are multifaceted and hardly restricted to text. As Bennett (2008) mentioned: "the enterprise is not just a 'small Internet' and full text query may not be adequate." In the case study we develop later in this report (an industrial company, which is specialized in logistic and delivery), the search engine can help locate vehicles or parcels sent by mail. According to this perspective, the development in natural language enables the users to ask questions, which can be answered directly by the search engine. This makes the query process simpler but leads to contextualization and encoding matters.

- *Result presentation:* Many innovative ways to present results have emerged lately, among which visualization. The development of firms such as Kartoo underlines this trend. Visualization can integrate clustering and categorisation features, and thus makes the understanding of the search results simpler.

Today, innovative projects systematically test alternative visualization solutions.

In addition, many requirements customize and influence the final quality and efficiency of the solutions offered (in terms of accessibility and ergonomics). These requirements show how search experiences can vary considering the range of needs expressed by employees. The requirements are the needs expressed by clients or the options offered by enterprise search providers. In other words, these are specific to enterprise search. For example, the security of data and stored information is not essential for the process of search to be valuable. If a solution does not provide security features (access rights according to the position), it does not put the actual search process into question. This step, however, is very much valued by enterprises, wishing to implement a new solution. The same reasoning can be applied to the other requirements.

The ability of the provider to respond to users' requirements tends to distinguish the solutions from each others.

2.1.2.2. The additional requirements of ESS

These particular requirements of the search process are important in the decision process, and have been integrated in the largest part of the offer and which are considered as a must have for clients. They are widely demanded by IT departments and indispensable for procurement. According to our interviews and literature review, the most important complements appear to be security, scalability and collaborative features. Other requirements are frequently identified in the literature: this may be the case for visualization or ergonomics and quality of human-machine interfaces, for example. We found, however, that such features are already embedded in the essential blocks (such as the query or results presentation). Other additional elements may turn out to be very important for users or decision makers: this is the case of the global cost of the solution, for example. Yet, the latter are either completely independent of the search technical

process (because they are related to the business model of the suppliers), or they are rooted in the infrastructure and may hardly be empowered as an autonomous component.

The most important additional components are the following:

- **Security:** this is a very important aspect of the search process in enterprises. Indeed, people must only access the information they have the right to consult. The engine must take into account these access rights in its architecture. This is a strong requirement expressed by managers and IT departments.

- **Scalability:** we already mentioned that the volume of information is exponentially growing. This is the reason why scalability is one of the strongest requirements from users. Without the ability to deal with more and more information, search engines would only work for a few years. They are, in fact, considered as part of a long term investment for the firm as the cost of change can be important.

- **Collaborative features:** this is the emergent component which is becoming more and more desired by clients. It can completely change search experiences by giving a role to the users in the process of search. This component can not only improve the quality of the search experience, it can also improve productivity. As such, this seems to be a revolutionary way to search in a business context. We analyze this trend in details in Part 6, but we can already assert that this trend has made the value chain evolve by enabling people to take part in the search process.

2.2. Valuing the search process: the structural shift of the value chain

The concept of value chain is interesting because it can help us understand the structuring of

strategic resources through technical competencies and positioning. The value chain is, however, not static and the search process cannot be only described by sequential technical arrangements. It requires a dynamic perspective.

To better grasp such dynamics, it seems important to consider the way users interact with ESS. Experiences can differ according to the company users and workers, their jobs, their needs and their position in the enterprise. As a result, the search calls for:

- *The answer to a question (such as who is the biggest client or what is the name of our contact in enterprise X?).* In this case, the request can be treated in natural language. The format of the information is well defined and recurrent: the user knows that the information he is looking for exists somewhere, but he may have trouble finding it, as information can be "hidden" and relying on both structured and unstructured data.

- *The answer to a client problem.* This is the most difficult element to deal with for call centres. The workers must quickly answer the clients' needs, access information concerning them and find the process followed in previous cases.

- *Something previously seen on the Intranet or stored in the information system.* In this case, the query is very precise and concerns only one document/video/image among millions. Although the question is specific, it can hardly rely on repeated routines and can hardly call for standardized processes and similar databases. These types of searches make the search process more complex. Indeed, keyword search can be inefficient and popularity (which is fundamental for the Web search model) can be useless. The search process must use more complex concepts, based on language or classification.

- *Something the seeker thinks exists, but actually does not!* This can come from an

intuition and is the more complex kind of search. It requires a semantic analysis of terms and a search in all formats, as the seeker does not know what it may look like (it can be an image, a database, etc.). In this case, the investigation process and the expected information are both implicit and very open.

2.2.1. The cost per value of enterprise search components

Considering the different kinds of needs, we describe the potential expected value of the elements of the search process. This drives us to break down the linear dimension of the value chain in order to distinguish the different parts of the value chain according to their cost and their expected value. We added the identified requirement as they also play a key role in the customer satisfaction and in the structure of costs of the provider. The cost is the economic weight firms give to the solution, as well as the research and development investment they require. The value is determined by actual and potential customers. Thanks to the interviews we conducted, we have been able to identify the requirements and the steps of the search process, which appear to be particularly valued by end users and potential clients.

We can provide the detailed analysis of the three main components of ESS according to their cost for providers and value for users:

- *Crawling:* it has a low impact on the cost for providers as the crawling process is highly automated and mainly done by robots. The techniques are run smoothly and already used in Web search. This element provides low value for the users, as the offer is very comparable from one provider to another.

- *Result presentation:* it has a low cost for the provider, as it can be done by a simple connector and embedded in the solution. It gives high value to the end users, as it organizes the results differently than the Google model and relies on different criteria,

which can help refine the query (relation between terms, etc.).

• **_Semantic analysis:_** it is very costly for the provider, as it requires high costs of research and development. However, it helps the end users who have more accurate and contextualized results.

Applying the same reasoning for the other processes and requirements, we can present the following distribution, according to cost and value (see Figure 11).

The figure shows that almost all processes or requirements concerned by disintegration are in the bottom right corner of the following mapping. This trend corroborates the fact that providers of requirements are attracted by high value and low cost activities.

These elements, however, are not central to the choice process, which is why these valuations can hardly be supported by figures. Only end users benefit from the value of the installed components. Moreover, it is interesting to highlight

that cost may be perceived in a very different way within the same organisation, and according to the accounting rules: IS departments will be more concerned by the global investment, while users in operational units are more concerned about the variable cost they have to support. We will see later that such different viewpoints may explain the wide range of existing business models and the variety of prices for ESS.

2.2.2. The shift in the value chain

Having observed the range of existing solutions and their evolution, we argue that the value moved from the former main components of search (content collection, crawling, etc.), which were technically challenging, to less technically challenging but more fitted for innovation parts (such as clustering categorisation or result visualization) or fields going beyond pure search (such as semantic analysis, natural language, etc.). Moreover the collaborative features embedded or added in many solutions changed the position of the split between back-end and user end. More and more, end users are involved in the process of indexing, clustering, categorization and semantic analysis (see Figure 12).

Figure 11: Cost and value chain for processes and requirements
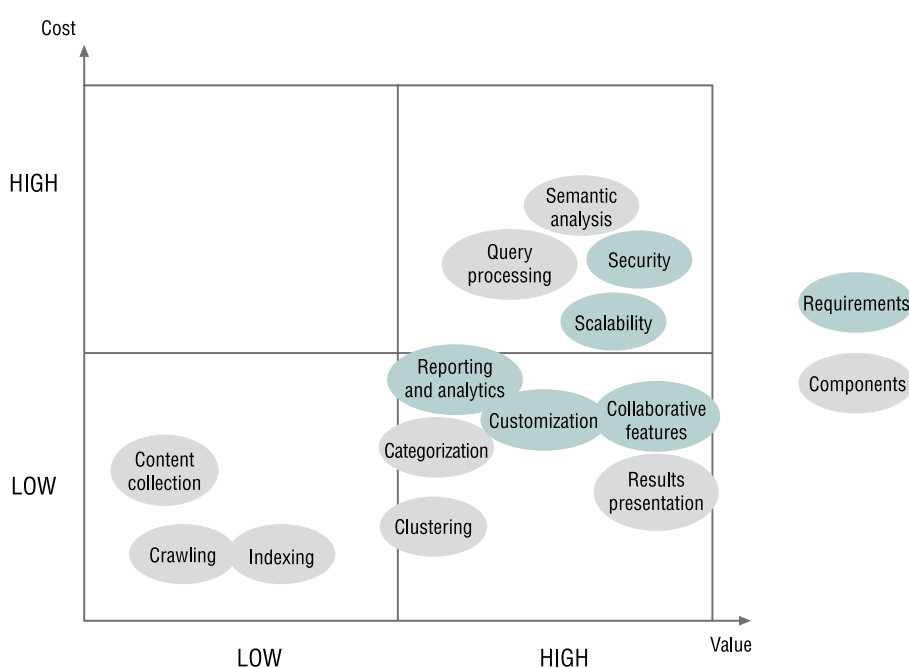
Figure 12: The effect of collaborative solutions on the enterprise search value chain

| Crawling | Content collection | Indexing | | Query processing | Matching | Results presentation |

Clustering

Categorization

Semantic analysis

Back-end   **User-end**
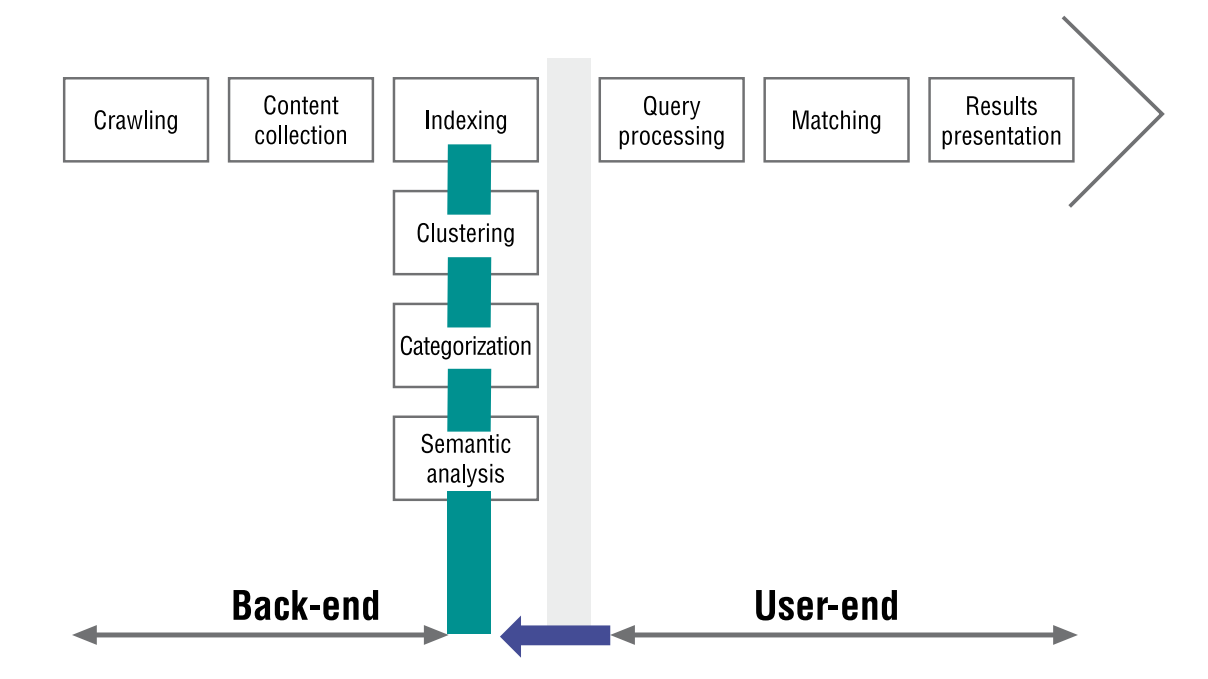
Figure 13: Shift in the value chain

Cost

HIGH

Semantic analysis

Semantic analysis

Meaning:

Before the shift

After the shift

LOW

Categorization

Categorization

Clustering

Indexing

Clustering

Indexing

LOW   HIGH   Value
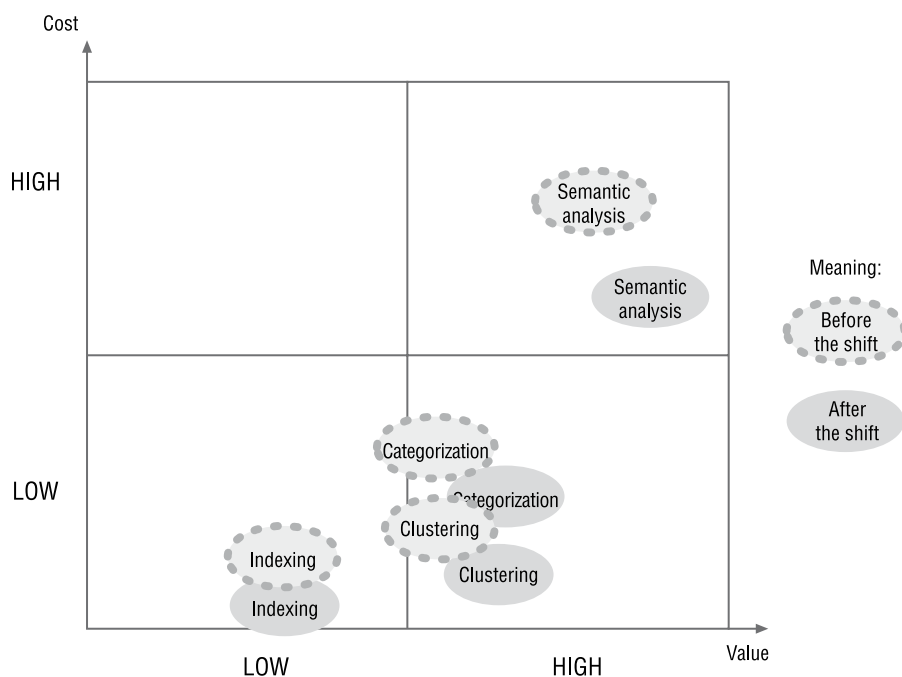
Such a shift in the value chain impacted the cost of the requirements concerned. Particularly it lowered the costs and improved the quality (and the value) of the parts of the process the end users are taking part in (see Figure 13).

2.3. Position and structure of the value chain: a strategic mean

Traditionally, most of the companies provided the entire components of the process of enterprise

search from crawling to reporting and analytics. But recently, however, the process has tended to disintegrate. As a consequence, many actors now offer specialized products. For example, a search solution vendor can provide the search applications and work with *Kartoo*, which gives the visualization component.

Partnerships are very common. During our interviews, *Exalead*, for example, insisted on the need to establish a network with implementers (such as Original Equipment Manufacturers (OEM) and/or independent software vendor partners). The companies also work with commercial partners (such as *Capgemini*) and technological partners (such as *EMC2* and *IBM*). As a result, they all are part of a business ecosystem (as described by Moore, 1996; or Torres & Guegen, 2004). These types of network relationships are very common and all major search providers now work with more than twenty partners.

The disintegration of the process between different actors is particularly obvious concerning the following steps:

- **Semantic analysis**: this activity is very specific and quite distinct from the technical parts of the process (as crawling for example). It is more related to language and how to bridge the semantic gap.

- **Result presentation**: many firms work specifically on this subject and provide very innovating tools to move away from the basic hierarchical model. For example, *Kartoo* provides visualization connectors for *Google* appliances, *Autonomy*, *Exalead*, *Microsoft*, etc. *Exalead* provides the synthesis between the basic model and the innovative features, by giving a list of links so that users can refine their requests considering the nature of the documents, the date of production, etc.

- **Reporting and analytics**: it can be managed by BI providers.

- **Collaborative features**: it can be added to the search solutions, but is more and more often embedded in the search process, which has become a component of the collaborative activities.

As we already mentioned, the organisation of the value chain is not just a mere abstract description. It is highly strategic and has operational consequences, as it contributes to the shape and design of data, competencies and practices.

Firstly, it influences the structuring of the data. Considering the importance given to the indexing part of the search process, identifying a specific technical component dedicated to indexing may favour the development of market niches (for supplier or software providers) and support more or less structured content. For example, the success of *Google* shows that users sometimes prefer simplicity and sufficiency to structuration. In this case, for each search, the box will crawl through the content stored. On the contrary, the solutions offered by *Exalead* value the indexing step, as this influences the quality of their semantic process. The indexing process is also in the core of the emerging search solutions based on social networks even if partly conducted by end users : this is the case, for instance, of start up providers like *Whatever*.

Secondly, the value chain perspective influences the relations and competencies developed by the economic actors. Stressing on the importance of particular components of the search process may lead actors to focus on these components and on the competencies required to make them better. And yet, some solutions may be built and designed to ignore certain steps of the search process. This is the case for emerging collaborative solutions, which neglect explicit indexing routines, assuming that it is (better) handled by users in their day-to-day activities and tagging process.

Finally, the structuring of the value chain influences the users' practices and their efficiency.

The choice of a solution partly influences productivity and the tasks undertaken by each employee. Emerging collaborative tools (such as the solution developed by *Whatever* called *Knowledge Plaza*, or the *Bluekiwi* software) renew the way search in enterprises is achieved and influences the competencies of users as well as their efficiency. In spite of this, productivity gains cannot always be determined. As we will see in our case studies, the productivity can only be calculated in some specific cases. For instance, when the search application is a business-to consumer one dedicated to e-commerce, a cost per click and a Return On Investment (ROI) can subsequently be determined. Similarly, when the search solution is implemented as a perfect substitute to existing services (in a documentation department or BI team), the net gain can easily be evaluated. This, however, only represents a very limited range of situations. ESS applications most commonly concern day-to-day business and work habits (as suggested in the *CEA* case). It is therefore very difficult to estimate productivity gains, as these gains are embedded in the whole activity and rarely calculated independently.

According to this perspective, ESS illustrate well the more general situation of IT services. The Solow paradox deals with this kind of difficulty in large financial investments in information and communications technologies (ICT), which do not always result in operational efficiency, revenue generation or profit maximisation. The history of IT in organisations has produced mixed results on business performance. As such, various authors have focused on the perennial problem of the productivity paradox (such as Strassmann, 1985; Weill, 1990; or Hitt & Brynjolfsson, 1996). They underline the fact that investments in IT have often resulted in a productivity paradox, as high IT expenditures do not always guarantee increased productivity.

Breaking down the ESS in the initial value chain we described, we suggest that users do not take part in the technical process (called back-end). They only intervene in the query process.

The entire technical process of the solution is automated and non visible for end users. These steps are defined during the implementation stage.

This trend has been modified due to recent evolutions related to use. Indeed, the categorization and the clustering have driven users to polish their requests, by considering formats, meaning, date of publication, etc. This trend is also evolving with the arrival of search based on collaboration. The collaborative tools enable to tag, recommend, and index the document users want to share. End users take part in the search process earlier in the value chain and put into perspective the technological importance of the indexing part. As a consequence, this contributes to restructure the offer.

2.4. The offer as seen by market analysts

Search tools have appeared to be universally adopted and implemented in the industry. Users can be found in every business sectors and in almost every type of enterprise, no matter its size, structure and localisation. However, "one size does not fit all" and the solutions offered are actually very heterogeneous according to the characteristics of industries and specificity of the users' needs. The providers now combine the technical parts of the value chain and its components to build their own solution. Still, this technical perspective is not completely efficient in order to study the ESS market. It therefore is necessary to present a specific classification, which can easily support the identification and listing of the various solutions.

Many classifications have been proposed in the literature and existing reports. They usually mix technical characterisation, strategic means and competitive positioning in order to present the structuring of the market. In the following pages, we first present the main existing and relevant classifications, then suggest a new classification in tune with the techno-economic analysis we developed.

Table 7: *AMR data*

	Platforms	Utilities	Coponents
Definition	Used to provide search in the context of many environments and applications. It is also extensible for classification, navigation, discovery, personalization, integration, text extraction and analysis.	Complete general purpose, index-to-interface search system, usually manifested for end users as a search box.	Components that complement existing navigation search and retrieval or adjacent systems like portals and content management systems. In many cases, they will come embedded in other platforms or applications. In others, they will be offered as independent enhancements.
Features	Provide industry-specific glossaries, taxonomies, or sample or template interfaces. However, they focus on the greatest common denominators across all navigation search and retrieval modes to ensure adaptability.	Navigation search and retrieval utilities are inexpensive, and easily installed and administered. They are often equipped with simple controls for tuning and configuring. They are valued because of their familiarity and intuitiveness for end users. Utilities are offered as hardware and software appliances and will be increasingly available in software-as-a-service (SaaS) offerings.	Separable components are for existing systems and include indexing or rules engines enhancements, navigation interfaces, text extraction, and datamining.
Clients	Fitted to customers who consider content vital to their business. Navigation search and retrieval platform customers have enough urgency and desire for differentiation to warrant a substantial investment not only in software, but also in skills that span development, linguistic and content domains. External support is needed for installation and maintenance of this equipment.	Companies with general purpose environments like corporate intranets, where a familiar predictable search experience is essential, use navigation search and retrieval utilities. While they may be appropriate for internal deployments for the most common search problems, they are not readily adaptable to more specific business scenarios, environments or content types.	Companies that buy navigation search and retrieval components are usually enterprises with significant investments and established standards for navigation search and retrieval already. They are, however, looking to fill gaps, improve security, scalability or performance, or improve usability and navigability for expanding scenarios and audiences.
Historical providers	Autonomy, FAST Search & Transfer (Microsoft), Exalead.…	Google is using the utility approaches in its initial foray into enterprise navigation search and retrieval. IBM has teamed up with Yahoo! for a competitive offering. Microsoft's Office SharePoint Server 2007 for search is also a utility play.	This is the primary approach of providers like Inxight (now part of Business Objects), FAST, Autonomy, and Open Text also have strong OEM and partner businesses, a strategy which IBM is also actively pursuing. Vivisimo and Siderean, while able to offer fully-fledged navigation search and retrieval platforms, have also demonstrated their innovative navigation modes atop existing commercial and open source navigation search and retrieval infrastructure.
New providers	IBM, Oracle	SAP plans to offer a search appliance that will plug into NetWeaver and offer search services to its portal and business applications.	

2.4.1. Classification in literature

Like most of the existing analyses of ESS, the main existing classifications have been proposed by the various consultancy companies, which regularly study the IS market.

Consultancy company *AMR Research* provides an interesting product classification that contributes to understand the structuring of the offer: the key conception has been to divide search-associated products into platforms, utilities and components. The results are presented in the following table.

This classification organizes the current product offer by type of component. In the following, we use this classification to place the main players according to the layer in which they operate, whether it is hardware, middleware, or software (applications). It is worth noting, however, that this classification does not fully contribute to the structuring of the providers, as most actors offer more than one category of product and almost all offer various components. Moreover, the distinction between platform and utilities, if relevant, is not subtle enough to describe all the differences, and especially the strategic ones, between actors.

To stress the different kinds of actors performing in the ESS market, the typology constructed by CMS Watch (2008) is a good start. Indeed, it distinguishes the various suppliers according to their marketing positioning:

- **Platform vendors**: the tools are complex, expensive and deployed on a large scale system.
- **Infrastructure vendors**: some of them offer a toolkit search, which is independent of their infrastructure offer, while some integrate the search function in their initial offer.
- **Specialized vendors**: they can cover more specific needs, as search is their core business. They fulfil complex demands.

- **Basic search vendors**: they mostly provide connectors for *SharePoint* search.
- **Turnkey solutions**: they offer hosted solutions or appliances plugged into networks. They are ideal for Web search and limited needs.
- **Open source vendors**: they are mostly focused on Web tools.

French analysts from SerdaLAB have provided another useful typology. They distinguish the different players according to their market and technological features. As such, they make a difference between:

- **Infrastructures vendors**: such as *IBM* and *Microsoft*;
- **General search vendors**: such as *Google*;
- **General and semantic engines**: such as *Exalead*, *Sinequa*, or *Autonomy*;
- **Statistical engines**: such as *Polyspot*;
- **Vertical engines**: such as *Lingway* or *Endeca*;
- **Open source engines**: such as *Lucene*, or *MNO Go search*.

None of these segmentations gives a clear understanding of the market structure as some categories gather only one actor and the distinction between the features of the engine are less and less relevant as they all start to include semantic features, for example, among others.

2.4.2. Classification: a proposal

Considering the inspiring key concepts of the existing typologies, we propose to build our own classification, synthesizing the various elements mentioned above. This classification is used to map and position the suppliers in the market and to take into consideration their potential diversification strategies.

According to this perspective, we have kept the classification in terms of technical layers, in order to analyse one of our main hypothesis, the convergence of the information system. Consequently, we partly adopted the typology of CMS Watch, but we added search 2.0 specialized

vendors as they are more and more present on the market and offering new innovative tools.

We identify, more specifically, the following actors:

- **Infrastructure vendors**: they arrived rather lately in the enterprise search industry. However, considering the importance of this emerging market, they decided to enter it by providing search toolkits not depending on their infrastructure offer, or search applications embedded in their initial offer. Among them are *IBM*, *Oracle*, *SAP*, and *Microsoft*.

- **Turnkey solution vendors**: they offer hosted solutions or appliances plugged into networks. Among them are *Google* or *Thunderstone*.

- **Basic search vendors**: they offer tools fitted for basic or *SharePoint* search. Among them are *Surfray*, *Isys* or *Coveo*.

- **Search specialized vendors**: their core business is focused on search. They offer elaborated tools and can fulfil simple needs to very specific demands. We consciously cancelled out the distinction between platform vendors and search specialized vendors, given that the acquisitions have led the platform vendors to be only represented by *Microsoft* (which acquired *Fast*) and *Autonomy*. Moreover, the technologies are more and more similar between platform vendors and search specialized vendors such as *Exalead* for example. They target the same kind of customers.

- **Search 2.0 specialized vendors**: they follow the Web 2.0 trend. They are working on the features of social networks, but apply them to the business context. They concern tools to liven the network up. Their goal is to make people indexing and enable information sharing. Among them are companies such as *Whatever*, *Connectbeam* and *Bluekiwi*.

For this part of the analysis, free open source solutions have been disregarded because they do not seem yet to be a real alternative for company use, as their low level of use seems to indicate; what is more, open source components are frequently used and integrated in some commercial solutions. As a consequence, open source solutions can hardly be considered as an independent segment: however, they will be discussed in the prospective part.

Considering the most important firms we studied in the second part of our analysis, it is relevant to identify and to portray the different actors active in the field of search solutions by means of a technical segmentation. The marketing segmentation is based on technical differentiation. We use the previously detailed classification and identify the segment each one occupies in terms of technical layers, and in terms of marketing segment.

The complexity axis refers to technological complexity in terms of scalability, as well as ability to retrieve all formats and to provide tailored applications. In other words, this axis refers to the amount of information the solution is able to deal with. It is therefore a proxy for the number of documents, the number of Intranets, and the number of references included in a commercial site. The technical layer orientation axis refers to the layer on which the providers generally work on. Such a distinction enables us to study the trends of integration and convergence. The technical layer orientation shows the structuring of the offer according to the level in which the solution is implemented. Given that the segmentation is based on technical features, it is interesting to consider how the offer is structured in relation to the technical level of implementation.

Figure 14 provides a comprehensive view of the way the market is structured in relation to the information system. We built this figure following the technical features of the solutions we studied.

Figure 14: Type of vendors according to their technical layer orientation and the complexity of their solutions
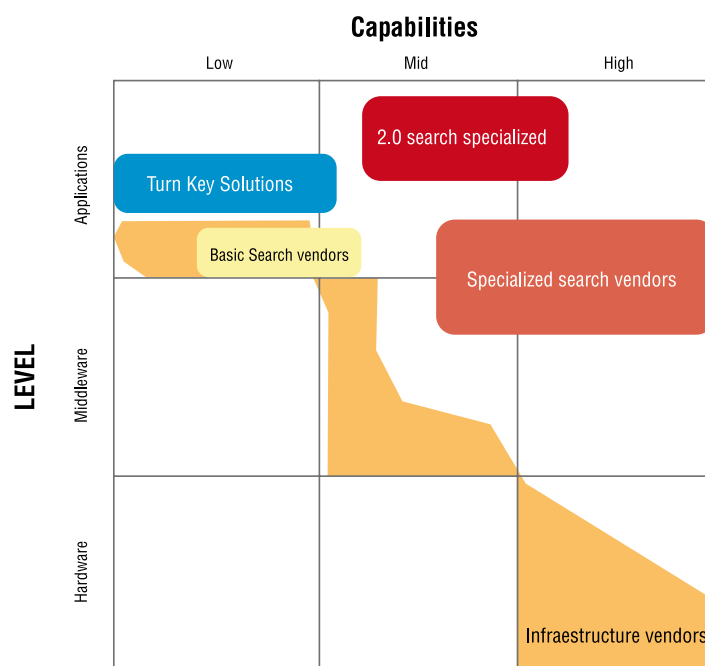
Infrastructure vendors tend to offer all technical levels and all complexity tools, moving to the top right corner thanks to their recent acquisitions. All other groups of providers offer tools on a given technical level and for given complexity.

The figure above is not a static one. There is a correlation between the level on which actors are performing and the complexity of their solution in terms of volume of data. However, mergers, specialisations or strategic integrations driven by the various actors contribute to shape evolving markets and contribute to change positions in the competitive field. For example, the infrastructure vendors tend to offer solutions on the application technical layer for less demanding needs.

Moreover, there is a strong tendency to develop products easier to implement and with higher capabilities. This is the trend search specialised vendors and search 2.0 vendors want to follow.

2.5. The market for enterprise search: a European perspective

We can also use the previous mapping to position the various specific companies according to their nationality. This can contribute to identify the international dimension of competition. Figure 15 provides an overview of the position of the main actors according to the technological domain they cover and their capabilities.

This figure suggests that European firms are absent from certain segments of the offer. There is no European provider for turnkey appliances and basic search solutions, while German *SAP* is present in the segment of infrastructure providers. The European firms are, however, very active in the fields related to specialisation in search. The figure illustrates their dynamism in this field but also the potential interest of acquiring firms towards them.

Figure 15: Actors according to their levels and their capabilities: a national perspective
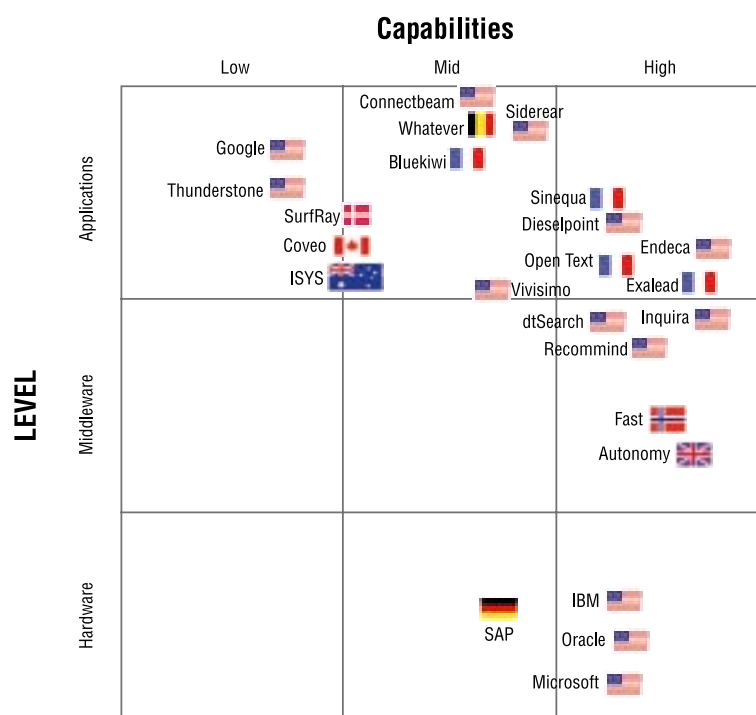
If we consider the national point of view, three French industries are active in the field of specialised search vendors, a sector which is dominated by American industries.

US industries play an important role in each segment. This is partially due to the importance of the IT sector in the US. In addition, this also is a result of the acquisitions undertaken by US firms.

In some cases, European firms were the first entrants in very innovating fields of search, and have maintained their leadership over the years. This is the case of UK-based *Autonomy*, one of the most influential vendors. In fact, European firms play an important role in the enterprise search market due to their R&D capabilities. However, as we will see in Part 6 of this report,

these firms could lack financial power and could then be acquired when big enough. This is one of the threats for European firms.

Some authors argue that the use of English language favours Anglo-Saxon countries, as the language barriers may hinder technical investments in idiosyncratic semantic tools. The argument may have been true a few years ago, but the various nationalities of the users of search providers demonstrate that the linguistic argument has been overcome. Vendors now have clients all over the world. The single linguistic limitation can be found in the niche of basic search vendors. In this case, we found that most of them are nationally based. In our view, this trend is mostly due to their limited and restricted size rather than to substantial language factors.

Conclusion

The structure of the market is not consolidated and many movements influence the market design and the value chain process and complements. We observe two opposite trends:

- A disintegration movement, with the development of many firms, which develop the valued parts of the process and focus their activity on them (collaborative solutions).

- A vertical movement, with acquisitions taking place along the information system structure (such as described in the case of *Microsoft* buying *Fast Search and Transfer* for example).

To complete these trends, we must underline the strong tendency of firms to establish partnerships. The market for enterprise search is structured as an ecosystem and all the providers we studied had more than ten partners in the various activities related to search.

■ Part 3. Choosing a Solution: The Users' Perspective

The previous parts of the report were dedicated to the supply side. They contributed to portray the design of the ESS market, the constitution of the value chain, its main economic actors and the dynamics and structuring of their strategies. It appears essential, now, to study the demand side. Indeed, while the ESS offering is highly diversified, it is very important to appreciate how it matches to the demand side. More precisely, this entails us to analyse to which extent the existing solutions actually fit the users' needs. It then requires us to determine the criteria companies use when they select a specific solution as well as the decision process they adopt when they purchase enterprise search engines.

As we will see in the following pages, confronting the ESS market structure and the users' perspective produces a paradoxical sentiment and exhibits contradictory trends. Users' approaches of search bring to light that in business environments, the specific contexts are important, because they deeply shape users' queries and expectancies: according to the industry, the firm department or the occupation at stake, requirements and relevant search information may be completely different. One should therefore expect the suppliers to target their engines and solutions for specific business applications. Moreover, it is worth emphasising that the market segmentation, corresponding to the various industrial activities, happens to be designed globally. ESS Suppliers hence give the impression that they favour a twofold strategy. They start by optimizing the quality of all-purpose search engines. After that, they focus on the implementation and the specific setting of their application, by supporting the pilot process of firm purchasers.

To stress and look into these contradictory trends, the following section first examines the nature and configuration of users' needs

for search. We then scrutinize more precisely the decision processes used by companies to purchase their search engine applications. Both aspects are, of course, strictly related. Information seeking in a business context is a strategic activity that can enable the firms to save time and money when successfully achieved. The articulation between the users' needs and the cautious choice of an ESS application is therefore an important challenge for ESS suppliers and the IS managers of the company.

3.1. The dynamics of demand

Considering the high number of searches per day and the different types of searches we already described (the answer to a question, a piece of information stored on the Intranet, something the seeker thinks exists in the information system and actually does not), the search activity seems to be highly dependent on context.

Two main dynamics determine the client's needs.

Demand is strongly influenced by the industry field the firm is intervening in. The kind of information sought depends on the industry they are working in. As we mentioned earlier, enterprise search is very much contextualized. According to the field users are working in and the kind of information and data they use, the search needs are very different and require different processes and treatments in terms of categorisation, semantics, etc. Also, the way information is stored and used strongly influences the users' needs, in terms of search and the way it will be carried out.

The internal divisions of firms influence the demand related to search. For example: what is

common between the requirements of researchers and the human resources director in terms of search requirements? Even in the same industry and in the same enterprise, needs differ. Search solutions therefore have to be tuned in order to answer these requirements.

The following section describes the way external and internal environments can influence the need for search. We determine how important these influences are in the structuring of the offer.

3.1.1. The requirements of industrial sectors

According to the kind of activity a firm is performing and the kind of product they sell, the various industrial sectors point out to different needs in terms of search solutions. Thanks to our literature review, our interviews and our case studies, we can suggest some basic guidelines to differentiate and characterise the various requirements of companies regarding search. These elements are summarized in Table 9, which stresses the key elements required by firms according to their field of activity.

3.1.2. The influence of internal divisions

The field of activity influences the needs and the choice of a solution. However, the internal structuring of the firm and its divisions also expresses different needs and therefore requires a different focus on the particular processes and aspects of the search solution.

Considering the practices supported by the various departments and services inside the firms, we suggest a high level of diversity regarding the use of information and the needs expressed in terms of search solutions. Table 8, we summarize the main needs and their depth in relation to structured and unstructured information.

The multiplicity of requirements expressed by departments confirms the complexity of the ESS providers' task when they conceive search engines. On one side, they have to implement solutions for the whole enterprise. On the other side, tools must be fitted to every department.

3.1.3. The implementation at stake

We have presented how the external environment of the firm (or industry field) and its internal architecture (the job function) influences the search corporate uses. As such, both these elements have consequences on the way ESS suppliers shape their offering. These elements structure the value chain: processes and complements have to comply with the corporate requirement so that every solution can be tuned for every sector and every job function.

Table 8:   Search requirements according to job function

Job functions	Search requirements related to job functions		
	Access to structured information	Access to unstructured information	Emerging needs
Human Ressources	All business organization documents		
Finance and administration	Cross-enterprise procurement		
Research and development	Work in progress and all past documents		Collaborative applications
Business development		Mostly external search broader than the Internet	
Marketing	Technical documentation, project business documents, customer support records		
Legal departments	Every internal or external document related to organization		

Table 9: *The most important elements by field of activity*

	Scalability	Computer-aided features compatible	Audiovisual retrieving	Presentation and vizualisation	Federating internal and external contents	Categorization	e-discovery	Analytics and business intelligence tools compatible
Consulting, law and accounting	They use vast amounts of data						Law and finance industries face e-discovery and compliance issues	
Engineering and manufacturing		Computer-aided design is largely used in this field	They use lots images and videos to describe the processes they are working on					
Biotech and pharmaceutical					They use both internal and external contents	Considering the huge amount of data they use and their different sources, they need filter and categorization tools		
Transportation								These tools helps to optimize the activity and are widely used
Publishing and media	Information is their raw material		They use lots of images and media contents		Part of their work consists in merging internal and external contents			
Aerospace and defense		CAD is an essential tool for them					They must follow very strict legal rules	
Finance				Visualization combined withs analytics is useful to make information synthesis	They use both internal and external contnts			these tools are in the heart of the day to day work

Table 10: Specificity of clients in different sectors according to providers

	Defence, security, aerospace	Bank, insurance	Water, Energy	Media
Exalead	DCNS	BNP Paribas, Caisse dépôts, Coface	WEC, Sellafield Ltd	Challeng. fr, Dalloz
Autonomy	Italian Ministry of Interior, US air Force	ABN Amro, HSBC, Bank of Spain	BP, Total	BBC, MTV, CNN
Endeca	NASA	Commonwealth		Guardian unlimited

To reconcile the various needs expressed by the industry field and the job context, the governance and management of the ESS project is decisive. ESS epitomize, accordingly, recent theoretical models on the interaction between organisations and technology: these models neglect the mechanical view of technology as an irresistible deterministic force, and instead emphasise the important role of organisations in shaping the appropriation and outcomes of technology-related change (see Barley, 1986; Orlikowski & Robey, 1996; Benghozi & Cohendet, 1998). Theories of social constructionists help us understand the fact that people and organisations co-create the technology, just as technology influences organisations and professional practices.

More precisely, the implementation process of the search solution in the enterprise is the result of two dynamics: on one hand, the corporate context the clients evolve in affects the nature of data and information, while, on the other hand, the internal division of the firms shapes the security and document access features.

Our observations have demonstrated, however, that these elements do not clearly and directly influence the choice of the provider. All providers tend to offer more and more adaptable tools that they can adjust when implementing them to fit the needs of their clients.

In Table 10, we illustrate this result by reporting the clients three different providers may have in different industries.

The multiplicity of industrial fields targeted by ESS suppliers is not surprising. Indeed, the management of data and information and the desire to search, find and exploit them is now an important concern in all industrial fields from consulting to defence and aerospace. All industrial fields are potential clients. In fact, even early adopters need their solutions to evolve or have to progressively add new components (such as collaborative features for example). Fields that were not traditionally clients of ESS applications are now thinking of purchasing solutions to face the increase of numerical data and the necessity to process and make use of it.

3.2. The corporate choice and decision process

We cannot estimate the potential size of the specific ESS industrial segment, as suppliers favour a global market, where all firms in all fields are potential clients. This is the paradox we already underlined in the introduction of this part. This paradox can be solved in two ways. On one hand, ESS suppliers tend to conceive all-purpose engines and define, adapt and fine-tune the settings through the implementation process. On the other hand, the corporate decision process may be disconnected from the specific requirements of day-to-day users and the purchasing routines, favouring standardised solutions supporting a large range of various customers.

In spite of the possibility to tune the enterprise's search applications during the implementation stage, the choice of the type of solution is a difficult one for the corporate customers. Once again, we discerned that the nature of the solution

or the provider (appliance versus embedded in middleware, pure players versus basic search providers) cannot be predetermined. As a matter of fact, price settings and costs largely influence the choice of the solution. Furthermore, the choice is important, as it influences the future restructuring of the value chain.

3.2.1. The non-economic variables of the decision process

Several professional consultants in the field of enterprise search have formalized processes for choosing. They generally identify and take into account a large range of criteria, which are both variable according to the choice and recommendations emerging from best practices. Recommendations are not our concern in this report. It is, however, interesting to review these professional reports in order to put forth the main criteria and to confront them with our interviews and experience. We first present the non-economic factors that determine the criteria used by the potential customers. We then detail the various dimensions of costs and their influence on purchase decision.

The nature of the provider: Theoretically, the customers should normally make a list of their needs and the specifications must be fitted to their needs, not to a solution or to a provider. This however is not always the case. Users must be careful about their acquisitions because of the time needed for technological integration: comparing and identifying the specificities of each kind of providers sounds rational, but, as it is the case for other technological or information systems, the choice of a provider is frequently made on a technological performance basis, independently of the actual needs. In such a context, turnkey solutions appear to be easy to use, as they are adapted to HTML documents and restricted needs. Pure players can also more easily adapt their offer to specific industrial environments, but remain more expensive.

The ability to test the solutions: Corporate decision makers are often risk-adverse in high technology fields. In most cases, they want to be able to test and experiment the applications they purchase in order to confirm it is adapted to their needs. These criteria cannot really discriminate the providers. Most of them usually propose to test their solutions, using a search engine embedded on the Internet site of the provider. Moreover, they often can install a test solution for a limited period.

The quality of ancillary functions: The absolute value of search performance is not the only aspect valued by users. In fact, the latter often give priority to – apparently – secondary functional characteristics. Potential clients focus on ergonomics, administration, security, technical constraint, etc. Personalization and interface are elements, which are considered as crucial for the tools to be used by employees.

The consistency of the information system: An ESS is embedded in the global IS, which is why it is important to keep its sustainability whilst implementing the application. These applications must be easily interoperable with other information applications, while the entire system must not be endangered by the addition of a new search system. As a consequence, the IS department is always a leading actor in the decision process and strives to impose its specific constraints to the search users. At the same time, the users are usually concerned about connecting the various components of the information system: the interoperability is a crucial aspect of the solutions and very dependent on the size of the IS. In other words, the solution is expected to evolve with the IS.

Once again, the internal division of the firm influences the choice of a solution through the decision process, because many actors from different departments can take part in the process and influence the final choice: tests are done by technical divisions, interoperability is authorized

by the computer department, ancillary functions are experimented by decision makers that are usually not the actual end-users of the ESS, and finally, the business model is considered by the financial divisions.

3.2.2. The economic factors that influence the corporate choice

Economic factors constitute a significant variable in the decision process. However, they hardly can be reduced to a single parameter. The price paid by the company is usually variable, because it depends on the way the application is framed according to the number of users, the amount of document indexed, the quantity of requests, etc. Moreover, the company has to take into consideration the cost of implementation and maintenance, the cost of hosting the data, the upgrading of infrastructure cost, as well as the cost of servers and operating systems.

From the corporate point of view, the economic dimension of the search engine purchase can hardly be restricted to the "price" of the solution or the mere ROI. On one hand, costs refer to the initial investment, but it is difficult to precisely anticipate and measure the "global cost" of the solution for the company. On the other hand, it is difficult to accurately identify the consequences of

the solution, in terms of earnings, savings or improved efficiency (whether it improves the marketing services, it reduces communication and documentation costs, reduces failures and malfunctions, increases efficiency of employees, suppresses duplicates, provides higher quality and satisfaction, etc.).

For all these reasons, it would be fallacious and delusive to present cost and ROI calculations.[20] Instead, it appears more fruitful to handle the choice of a solution as a sequential process, setting in motion different decision makers or actors of the company, and activating different criteria at each step.

3.2.2.1. The price associated to a product

If we consider the elements we collected from suppliers and the different analyses provided by the various sector outlooks, the costs of the various solutions could be estimated following Table 11.

This classification is relevant, although it appears that the choice of a solution is more and more based on the type of contract associated to a given product. We propose a classification of the various alternatives based on the way the solution is implemented. We focus the following analysis on the concept of total cost of ownership, which includes all the costs the firms must face when they decide to implement a solution.

Table 11: Baseline cost and initial investment

Hosted search solution	Vendor operates search installation, indexes the content and provides a complete solution	€5,000 – €100,000
Search Appliance	Hardware and software provided by a single vendor	€2,000 – €10,000
Local search installation	Licences of software and open source solutions	€500 – €3,000,000
Free services	Internet search engines	0

Source: CMS Watch

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20 A similar outcome has been identified by Bennett (2008).

3.2.2.2. Transaction means and price setting

Independently of the basic price, purchasing an application and implementing it can be made according to very different means: a firm can acquire licences for a package or for an "all inclusive software", buy basic software or pay for specific developments, or rather pay for a service supported by a specific ESS.

The enterprise data structure largely determines the choice of the implementation mode and the inclination for some transaction means rather than others: it may depend on the structure of the data (highly structured or unstructured), its origin, localisation or format, as well as on the amount and level of information to be indexed.

Let us give an example. To make possible effective and efficient information search, organisations have to put together disparate information systems between their functional departments and across their partners. A highly complex information system may impose significant integration challenges, which are often expensive and hardly sustainable with a simple pre-packaged software application. Thus, if the organisation requires sophisticated information tools and a cross-functional and cross-organisational integration of information systems, the provision of Software as a Service (SaaS) may emerge as a profitable solution, given that it enables the company to avoid the high cost of initial technological investments and the complexity of information integration. Both these difficulties may inhibit firms from rapidly purchasing ESS and improve internal business processes. By contrast, if the data is considered as a strategic asset, the SaaS will not be chosen as it implies a risk of data loss. SaaS generally implies that the data is stored on the provider's servers, which can be problematic if the data is confidential. Moreover, the SaaS mode is built on network connectivity. As a consequence, the availability of data is highly dependent on the network quality of the service.

It is interesting to underline the relation between two opposite technical layers such as "service" on one hand (with ASPs) and "infrastructure" on the other hand (with network QoS). This highlights the importance of the chain value and ecosystem structure approaches we developed above. In particular, this may explain several diversification trends we presented in the figure depicting the different layer orientation and the complexity of solutions (Part 2, Section 2.4.2.).

3.2.2.3. Indirect costs

When a company purchases an ESS, additional expenses to the initial basic price are necessary to implement the solution. These indirect costs may be immediately identified and directly accountable within the project: this may be the case for learning services, maintenance or software updates. Other expenses are more difficult to trace back. They are, however, necessary for the general operation of the organisation and the performance of the application. Each one of these costs has to be taken into account by the organisation to assess the global expenditure of the ESS investment.

In Table 12, we attempted to weigh the importance of these costs according to the type of contract.

The basic price, publicised on suppliers' catalogue, does not make any sense. Prices are dependent on the number of users and the number of documents indexed. They may also vary according to the scope of the solution and the way it is implemented. Each kind of solution may propose multiple methods to host the solution and numerous approaches to implement it. Accordingly, the costs are not the same and are not split the same way.

We listed the types of contracts associated to the acquisition of a search solution and we evaluated the associated costs.

The choice of a solution depends on the type of costs firms wish to minimize and the volume of information they want to be indexed. The choice of a

■ *Table 12: Type of solutions and their associated costs*

Type of contrat	Type of implementation	Example of provider	Nature of costs	Importance of costs
Investment in a licence	Integrated solution	SAS	Acquisition	High
			Implementation	High
			Training	High
			Maintenance	High
			Scalability	Low
Invesment in a licence	Software	Exalead	Acquisition (licence)	Depending on the number of documents
			Implementation	Mid
			Maintenance	Low
			Training	Low
			Scalability	Mid
Subscription	Software as a service	Whatever	Subscription	Depending on the number of users
			Implementation	Low
			Maintenance	None (Included in the subscription)
			Training	Low
			Scalability	Mid

solution also depends on financial conditions: SaaS, for example, enables firms to include the price of the subscription in their operating costs contrarily to the cost of a licence, which is part of capital assets. All these costs highly influence the decision process.

3.2.3. The participants to the decision process

The solutions mentioned previously have different total prices, but also different ratios of direct to indirect cost. Such differences may contribute to explain the importance of the various decision makers according to their position in the decision process. We already presented different viewpoints expressed by functional and IS services in relation to standardised or customised applications. Similarly, according to the accounting rules, some members of the organisation may be particularly aware of the specific costs and take them into consideration to make their choice. In general, the top management of the company will look at the highest ROI, the procurement department will try to minimize the direct costs of purchase (price and invoiced additional services), whereas the IS department will focus on traceable indirect costs (maintenance,

technical support, and communication traffic), and the end users will pay attention to the hidden indirect costs (such as time losses, possible productivity losses, or costs of replacement and training of new employees).

Hence, acquiring a complex search solution can be a way to lower the competitive intelligence costs, while – if capital costs must be minimized – outsourcing may be a better option and SaaS will be chosen as it only entails maintenance and subscription costs.

3.2.3.1. Who decides?

According to the study led by the *Ark Group* published in October 2005,[21] entitled *The Age of Search*, IS supervisors are the instigators of most search projects. Knowledge managers also often take part in the decision process. It is important to note that adding the percentages together brings a total superior to 100%, the decision often being taken by several actors of the firm (Figure 16).

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21 Quoted by Balmisse (2006).

Figure 16: Who decides to implement a search solution
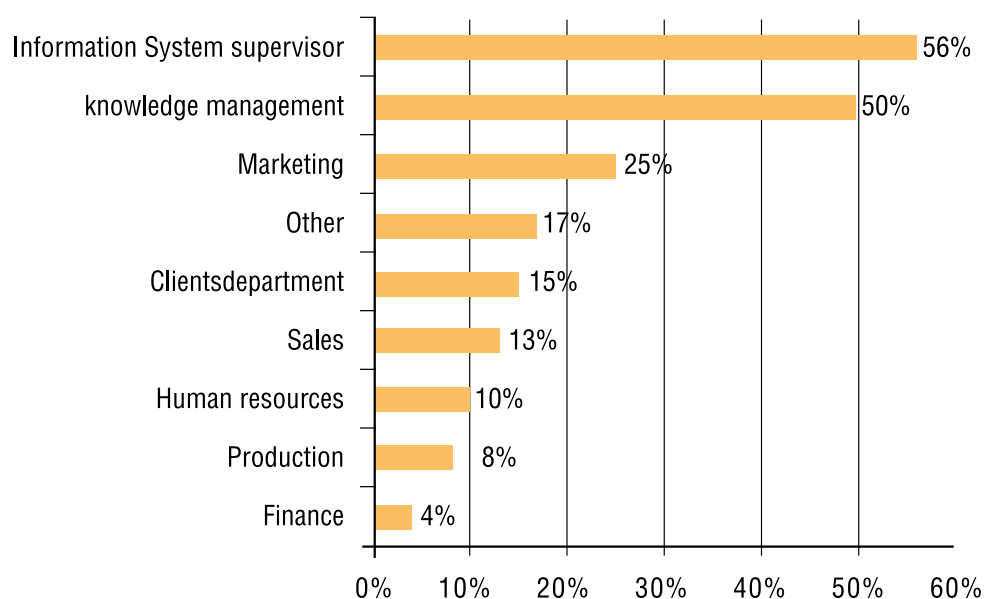
Source: The Age of Search (Ark Group, 2005).

Figure 17 summarizes the two main factors that influence the choice of a solution. On one side, the decision maker's choice is related to the costs of structure (if the decision maker is an accountant, he is likely to give more importance to the financial rather than the technical criteria), while, on the other side, the choice is related to the nature of the data (as explained in the previous analysis on the influence of internal divisions).

Figure 17: The determinants of the choice of a solution
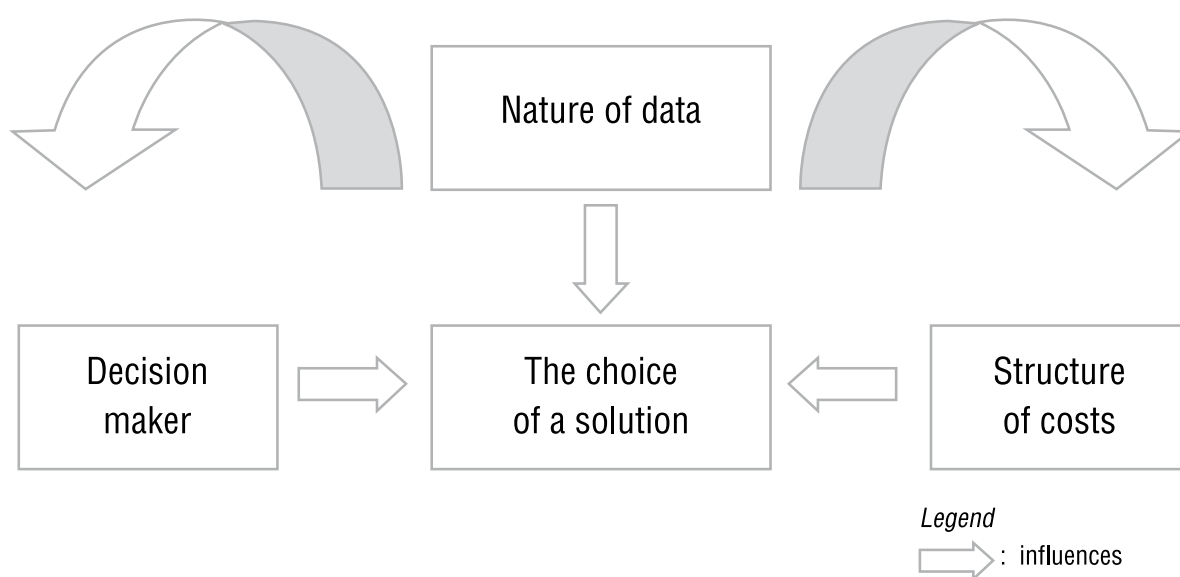
Conclusion

We identified two main dynamics which determine the client needs:

• The industry field the firm is intervening in as Enterprise Search is very much contextualized.

• The Internal division of the firm and the scope of the Enterprise Search project.

We found that these two dynamics are taken into account through the process of implementation of the search solution which results from the co-creation of technology between the firm and its clients. Tools are required to be adaptable.

Finally we identified the economic factors which influence the choice process and the main actors originating the acquisition and following the implementation. Price but mostly indirect costs play a major role on the choice of clients and the Information System Supervisor are frequently at the origin of the implementation project.

■ Part 4. Trends

As we mentioned previously, the ESS market is still a new non-consolidated IT market: it is characterised by the dynamism of its industrial actors and a continuous transformation of its competition structure. Progress in retrieval technologies, financial instability and social demands will undoubtedly influence the market in the forthcoming years, as it will enter a consolidation phase. In the following, we identify and discuss the trends that may potentially influence the ESS market, with waves of mergers and acquisitions, with the expansion of the market, and with new diversification and specialization strategies.

4.1. The past waves of acquisitions

The past era has been characterised by the consolidation of the market, through the acquisition of competitors and an expansion to specific domains. If we consider the tendencies

that have occurred since 2005, we see that a dominant and powerful position does not necessarily prevent more acquisitions. Indeed, throughout the years, the latter have concerned all types of vendors, and many former buyers have actually acquired other buyers. The orange arrows in the following diagram represent the acquisitions, which took place from 2000 to 2008. They also reveal the rhythm and rate of acquisitions, by indicating specifically when the buyers were bought. We mainly used press releases and the providers' websites to build this diagram.

4.1.1. The succession of acquisition

The diagram below draws attention to several facts worth mentioning:

- *Verity* was financially strong enough to buy *Inktomi Ultraseek*, but three years after, it was acquired by its main competitor *Autonomy*.

■ Figure 18: The acquisitions in the ESS market since 2005
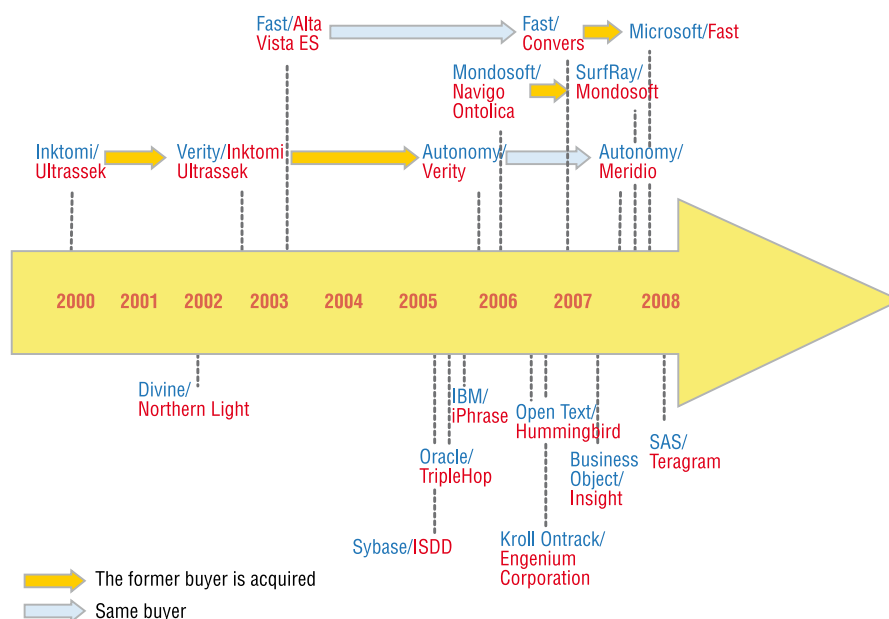
Table 13: Reasons for acquisitions, following Gammelgaard's extended topology

	Motive	Result	Theoretical explanation
Focused on the resources of the acquiring firm	Minimize cost	Large scales reduces different kinds of cost	Economics of scale
	Minimize cost	Hierarchical solutions reduces governance cost	Transactions cost
	Market shares	Create or extend sales opportunity	Growth
	Market power	Above-normal profit	Monopoly
	Minimize risk	Minimizing fluctuations in revenues	Diversification
	Minimize financial cost	Reduced capital cost and utilizing of tax shield	Debt/equity
	Speculative	Acquisition's price is lower than correct market price	Undervaluation
	Managerial ambitions	Maximizing managers wealth	Empire-building
	2+2=5	More efficient use of pooled complementary resources	Synergy
Focus on the resources of the acquired firms	Competitive advantage	Core-competencies secure a sustained competitive advantage	Competence
	Resources	A unique pool of resources, and efficient management of these	Resource-based
	Position	Taking another position in a different network depending on trust and relations	Network
	Center of competence	Previous relations create the needed private information to pickout a target with competence. It is possible to transfer resources and make use of them in a profitable way	Combined approach

- Since 2006, new actors have appeared and transformed the market.

- *Microsoft* bought the enterprise specialized search vendor *Fast Search and Transfer*.

- BI vendors such as *Business Objects*, *Cognos*, and *SAS*, have been integrating in their products enterprise search and retrieval solutions from *Autonomy*, *Fast*, *IBM*, *Google*, among others.

- BI vendors also acquired text-mining providers to reinforce their search offer.

4.1.2. The motives of acquisition

In order to better characterise the logics of acquisitions in the ESS market, the typology proposed by Gammelgaard (1999) is inspiring. We used it in the table above. This typology is based on theories from different fields in economics and management and explains the various motives of acquisitions. It also gives a dynamic extension to the traditional typology of acquisition motives. The latter are not exclusive and several other motives are possible. The ones mentioned, however, are supported by a theoretical explanation and will be used later to comment the facts and events we identified in the recent evolution of the ESS market.

The previous analysis distinguishes two types of inside-market and outside-market acquisitions. In the first case, only players in the search market are involved and balance the power between search competitors. The second case involves non-search industries, thus repositioning the boundaries of the market.

4.1.2.1. Acquisitions involving search players only

This phenomenon concerns acquisitions between direct competitors. Here, the buyer and the acquired company are active in the same sub-market and share a similar client base. This applies to *Autonomy* that acquired *Verity*, *Surfray* that acquired *Mondosoft*, *Open Text* that acquired *Hummingbird* or *Fast* that acquired *Altavista ES*. Acquisitions among competitors generally suggest the beginning of market consolidation. It increases the market power of the acquiring firm by absorbing the market share of "dangerous" competitors. It also is a way to extend sales opportunities, by achieving higher growth rates.

Another corporate strategy of larger generalist companies is to buy specialists acting in niche markets. Some examples of this trend include *Mondosoft* that acquired the *Taxonomy* software provider *Navigo Ontolica*, *Sybase* that acquired the mobility specialist *ISDD*, or *Autonomy* that acquired *SharePoint* specialist *Meridio*. This guarantees an access to new expertise and synergy. The new expertise is expected to boost innovation by taking advantage of the financial muscle of the acquiring firm. Synergy effects are expected to arise from unifying competencies, and complementary resources. In sum, firms are expected to obtain a competitive advantage by developing leading innovations.

The ESS market seems to follow a similar pattern as the BI market. In the latter case, generalists supplanted specialists by progressively acquiring them (in 2007, *Oracle* acquired the US firm *Hyperion*, *SAP* acquired *Business Object*, and *IBM* acquired the Canadian *Cognos*). From that point onwards, actors outside the original domain began to enter the market.

4.1.2.2. Acquisitions involving non-search companies

A second wave of acquisitions has involved non-specialized search players entering the search market. We noticed the incursion of big information system players in the search market or in the market for unstructured data. *Oracle* acquired *TripleHop*, which is specialized in context-sensitive enterprise data, *Microsoft* acquired enterprise search specialist *Fast*, *IBM* acquired content manager *Iphrase*, and *Divine* acquired *Northernlight*. This diversification strategy has enabled information system providers to both minimize risks and to enlarge their network. The ESS market was considered to be profitable by infrastructure vendors and search had become an essential piece of their offer. In addition, search presented an opportunity to conquer a competitive advantage by enriching the vendors' existing offer with search components.

BI vendors have also attempted to offer better search capabilities by acquiring actors of search and more precisely text-mining actors. Examples here include *Business Object* buying *Inxight*, and *SAS* acquiring *Teragram*. This phenomenon also refers to network and diversification strategies. Today, the frontiers between search and BI blur as BI providers offer search tools, while search vendors add features of BI to their products. This assertion strengthens our hypothesis concerning the coming convergence between information system and search engines.

Changes in the value chain have driven some firms to acquire actors playing in this field. Table 14 presents some representative examples of recent acquisitions with their main motivations.

Given that the market is not yet consolidated, we can assume that acquisitions and mergers will continue. One way to explain this may be that technological components are not yet sufficiently standardized for such cases.

While some search providers may be concerned, in the coming years, about being acquired by their competitors dealing with information systems or BI, for some niche players, this may actually become the only way to survive, unless they have sufficient financial power to develop their business. In some cases, specialists may capture part of the market by acquiring specialized search vendors or niche players, as this has been the case in the BI market. Today, only technical and semantic barriers seem to be able to bring this trend to an end.

4.2. Identifying and discussing the competitive trends

If the trend of acquisitions continues, it could lead to the disappearance of search pure players. However, if BI and ECM vendors succeed in bridging the worlds of structured and unstructured information (as *IBM*, *Microsoft*, and *Oracle* are also trying to do), then they are likely to require search technology and expertise. Pure player enterprise search vendors, such as *Autonomy*, *Convera*, and *Fast*, still have an advantage over some of the bigger players when

it comes to specialised competencies, even though it seems that the market forces and the continuing trend for technology standardisation might result in a few vendors dominating the enterprise search landscape and maybe little by little invading other markets (*Autonomy* acquired *Interwoven* in January 2009 and tends to be a challenger in ECM instead of a dominant player of enterprise search). In the long term, search tools are likely to be more integrated in IS or other integrated tools.

To assess the evolution of the past dynamics and consider the future ones, we focus on the so-called "magic quadrant" provided by Gartner. This magic quadrant is a market analysis, providing a mapping of the major firms in an industry, and distinguishing four types of actors: leaders, challengers, visionaries and niche players. Considering the various positions of the firms on the quadrant gives a dynamic view of the leaders of the market. We use Gartner's magic quadrants to comment the evolution of the ESS market.[22,23]

In the specific case of ESS, we observe a decline in the number of actors and a different evolution of several strategic actors over time.

Table 14: *Motives of acquisitions in the enterprise search industry*

Acquiring firm	Acquired firm	Example	Motives
Search specialized	Search specialized	Autonomy/Verity Surfray/Mondosoft	Growth and market power
Search specialized	Search related specialized (semantic for example)	Fast/Convera Autonomy/Medirio	Synergy and competitive advantage
Information system	Search specialized	Microsoft/Fast	Competitive advantage, network and diversification
Business intelligence actors	Search specialized	SAS/Teragram Business Object/Inxight	Network and diversification

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22 Original information and Gartner's analyses are available at the following addresses: http://www.gartner.com/technology/research/methodologies/research_mq.jsp and http://www.gartner.com/technology/research/content/business_intelligence.jsp

23 The description of the axis, the typology established, and the methodology are developed in appendix 3.

4.2.1. The dynamics of providers from 2002 to 2008

We first study the dynamics of the major providers from 2002 to 2006. We observe that, during this period, the providers we studied moved a lot and changed their status in the overall typology (from niche player, *Google* became a challenger, while the niche player *Fast* became a leader).

From 2002 to 2006, the market was very open and the positions were not established. Leading positions were accessible and the hierarchy could be altered. In the following, we characterise the evolution of the major providers.

• Two providers remained leaders from 2002 to 2006, namely *Autonomy* and *Verity*, before the former acquired the latter.
   – *Autonomy* consolidated its position gradually from 2003 to 2006.
   – The situation of *Verity* turned to be more erratic in terms of its marketing strategy and market vision.
• *Fast* was initially a niche player that steadily grew into a strong leader (integrating the "visionaries" fraction of the quadrant).

• *Endeca* followed a similar pathway as *Fast*, though with less magnitude.
• *Google* became a challenger due to its improvement in its ability to execute specific tasks, to respond to the market and to structure solutions adapted to corporate requirements and business consumer experience.

When we confront these facts with the static positions of the providers that emerged in the next period, these moves are clearly representative of a future period of consolidation.

To understand the evolution of the market dynamics we match Gartner's four categories (niche player, visionary, challenger and leader) with the categories of the ESS providers we defined in the second part of the report.

4.2.1.1. 2006: an open market

In 2006, Gartner displayed the thirty most important providers across the four quadrants. At the time, there were a large number of providers in all situations, and no specific positions were associated to the different types of providers. Enterprise search specialists could be found in every situation, from niche players

Figure 19: Gartner's magic quadrant in 2006

As of 1 August 2006

challengers	leaders
7 providers:	**3 providers:**
1 infrastructure provider	3 ES specialized
1 turnkey solution	
1 basic search solution	
1 ES specialized	
3 non-search specialized	
12 providers:	**8 providers:**
1 infrastructure provider	1 basic search solution
1 turnkey solution	5 ES specialized
1 basic search solution	1 text mining provider
7 ES specialized	
2 site search specialized	
1 non-search specialized	
niche players	**visionaries**

■ *Figure 20: Gartner's magic quadrant in 2007*

challengers	leaders
5 providers: 2 infrastructure provider 1 turnkey solution 1 ES specialized 1 non-search specialized	**5 providers:** 1 infrastructure provider 4 ES specialized
15 providers: 8 ES specialized 1 basic search solution 1 turnkey solution 1 site search specialized 4 non-search specialized	**7 providers:** 1 basic search solution 4 ES specialized 1 BI provider 1 site search specialized
niche players	**visionaries**

(such as *DieselPoint*) to leaders (such as *Endeca*). The same was true for challengers, which belonged to very different segments (non-search specialists to infrastructure providers). Leaders were only enterprise search specialists, with *Autonomy* and *Fast* dominating the market. The continuous trend of acquisitions changed this situation and new kinds of providers appeared in the leader segment.

4.2.1.2. 2007: concentration and specialisation

In 2007, two additional actors joined the club of leaders, namely *IBM* and *Zylab*. Many 2006 important players had been replaced and the distribution between the strategic positions had changed. There were more niche players and more leaders, but there were still many important solution providers from very different origins. *Autonomy* was dominating the market with a very high ability to execute and a full completeness of vision. *Fast Search and Transfer* lost its ability to execute the required tasks, but remained one of the leaders on the market. The most important change took place in the leader quadrant, where one infrastructure provider (namely *IBM*) became a leader, together with four enterprise search specialised providers.

This trend has exhibited the new tensions, which will probably shape the market in the long run.

4.2.1.3. 2008: less variety and offer tightening

The major changes in the ESS market took place in 2008, with the number of players going down from thirty two major players in 2007 to only fifteen major providers a year after, including ten enterprise search specialised providers. This indicates that the market has become more mature, even though the consolidation phase is not finished yet. The diversity of the most important providers has however decreased.

The "infrastructure provider" *Microsoft* joined the magic quadrant by acquiring the previous leader *Fast Search and Transfer*. This trend shows the strong interest of these specific players for the ESS market. In fact, another infrastructure provider (namely *Oracle*) is not far from becoming a leader. We can assume that the acquisitions of a visionary search specialized actor could give it the sufficient power to become a leader.

Figure 21: Gartner's magic quadrant in 2008

challengers | leaders

Google •
Oracle •
Open Text •
IBM •
ZyLAB •
Vivisimo •
ISYS Search Software •
Fabasoft/Mindbreeze •
Kazeon •
Recommind •
Exalead •
Expert System •

Microsoft •
Autonomy •
Endeca •

ability to execute

niche players | visionaries

completeness of vision

As of 1 August 2008

challengers

3 providers:
1 infrastructure provider
1 ES specialized
1 turnkey solution

4 providers:
3 ES specialized
1 basic search solution

leaders

6 providers:
2 infrastructure provider
4 ES specialized

2 providers:
2 ES specialized

niche players   **visionaries**

4.2.2. The recent movements: a synthesis

The market is structured around six leaders and many other vendors fighting to win their place in the leader quadrant. The proximity of each player near the frontier strengthens the uncertainty concerning the future evolution of the market.

The positions of companies within the quadrant are not fixed yet and will suffer changes in the years to come, basically through organic growth and acquisitions. If market leaders like *Autonomy* and *Endeca* are not acquired, they are likely to reinforce their market position given their competitive advantage of size in this ongoing consolidation process. Through the acquisition of a previous leader (FAST) and its financial power to expand business and technological developments, *Microsoft* is likely to consolidate as a leader in the years to come. The ESS market is still expanding and sufficiently large enough to accommodate approximately three leading competing leaders. Which ones will be the leaders is uncertain (possible candidates include companies such as *Oracle*, *Recommind* or *Exalead*).

While the evolution of the market in the period from 2002 to 2006 was highly dynamic, with many changes of companies within the quadrants, the period from 2006 to 2008 has been characterised by less actors, whose positions have moved slowly.

- Stable actors:
  – *Google* has remained in the challengers' section.
  – *Autonomy* has remained in the leaders' section, moving towards the visionaries.
  – *Endeca* has remained in the leaders' section, slightly shifting towards the right of the section.
  – *Recommind* has remained in the visionaries' section.

- Evolving actors:
  – *IBM* has remained on the fringe of two sections, shifting from the challengers' to the leaders' section.
  – *Vivisimo* gradually moved from the leaders' section to the visionaries' section.
  – *Exalead* has clearly evolved from the niche players' section to the visionaries' section.
  – *Oracle* stepped from the niche players' section to the frontier between challengers and leaders.

Only *Exalead*, *Vivisimo*, *Oracle* and *IBM* have moved into a different quadrant. This strengthens our hypothesis concerning the fact that the market is consolidating. Only new acquisitions should change dramatically these trends.

In the years coming, we assume that the content of the quadrant may be modified by the changes in the structuring of the market. Indeed, the arrival of collaborative tools and their relative success on the enterprise search market should transform the major actors and should support the emergence of new players.

■ Part 5. The Exalead Case Study

A case study methodology has been adopted for this research. This has enabled us to compare our findings across a wide range of situations, by drawing out contextual differences. We focus our survey on *Exalead*, a significant actor in the ESS market (as mentioned above). We used interviews, collection of data, corporate documents and promotional material presenting *Exalead* activities and customers in order to elaborate the following monographs. It provides us the opportunity to characterise the organisation and the strategy of providers. In addition, it helps us understand the way these providers undertake their project implementation with their customers.

5.1. Presentation of the company

Founded in 2000 by search-engine pioneers, *Exalead* (www.exalead.com) is a global provider of software designed to handle all aspects of information search and retrieval, for every sector and for organisations of all sizes. *Exalead* software is used by leading banking and financial services, the media, consumer packaged goods, research, retailing, sports, entertainment and telecommunications companies around the world, including *Air Liquide*, *BNP Paribas* and *Carlson Wagonlits*.

The *Exalead* application is based on a unified technology platform for desktop, Intranet and Web searching. The company targets small businesses or global enterprises and provides solutions for one up to thousands of desktops, in any technological environment. It can support internal information services or information supporting business-to-consumer commercial activities. As such, *Exalead* has a broader product portfolio than other competitors, as it covers desktop search to Web search.

One of the technical specificities of the *Exalead* solutions is to provide an integrated platform supported by a generic data-layer and flexible applications. This gives *Exalead* the capacity to propose a hasty implementation. According to the *Exalead* commercial department, the company is able to implement a classic Intranet project in four days (versus twenty for the main competitors) and a complex on-line directory in three months (versus eighteen for the same competitors).

To analyze the activity of *Exalead*, we focus on three business cases:

- The first and core activity of *Exalead* is **enterprise search**. It is focused on how an organisation can get and provide easy and relevant access to information available, through its Intranet or the different repositories of its clients' information system. The example of France's Atomic Energy Commission gives us a typical case of such an application.

- The second main activity of *Exalead* contributes to one third of its turnover. This is the **search-based application implementation**. This activity is well illustrated and detailed in the case of French logistics supplier *Gefco*.

- Finally, *Exalead* provides **Web portal search**. We study this activity throughout the case of *Rightmove*, the UK's number one property website.

5.2. Case 1: An enterprise search application – France's atomic energy commission (CEA)

The French *Commissariat de l'Energie Atomique* (*CEA*) is one of the largest public

research organisation in the world, with more than 15,000 researchers and collaborators working in the nine principal research centres. Their five civilian centres host more than 150 Intranets accessed by more than 10,000 users. *CEA* focuses on fundamental and applied research related to the use of atomic energy in the fields of science, industry and national defence.

5.2.1. Requirements

CEA sought for a solution, which could index more than 50,000 documents to handle their growing business. They wanted a unified solution that could search across all databases, Intranets and sources, and which could give more relevant results. They also required an updated search interface to navigate in a more user-friendly way. They were, in fact, looking for automated and flexible management tools. Their Intranets host around 200,000 documents, 20% of which are desktop files, with the other 80% being HTML Web pages: they wanted to be able to enlarge the range of solutions if required.

5.2.2. Existing tools

CEA had a previous search engine utility that had been conceived to facilitate access to its principal Intranet portals. However, the tool had reached its performance limits (it could only index 50,000 documents), and the amount of information of the *CEA* was quickly growing. Moreover, the interface was not adapted anymore to users who were becoming increasingly accustomed to easy-to-use Internet search tools.

5.2.3. The choice process

When *CEA* decided to adopt a new ESS, it launched a call for proposals, and requested application prototypes from the leading six respondents. The prototypes were to index 50,000 documents spread across thirty Intranet sites. Two of the bidders stumbled over technical problems during the indexing phase, encountering performance issues when

indexing office documents. For the remaining bidders, *CEA* analysed the relevance of the search results using a sample of twenty search requests. This evaluation was complemented by end user tests, which helped *CEA* pinpoint user expectations, in particular regarding the product interface.

They considered the following criteria before adopting the solution submitted by *Exalead*:

- Scalability;
- Result relevancy;
- Query response speed;
- Web-based interface.

5.2.4. Deployment

During the implementation process, *CEA* contributed to the technical configuration, helping *Exalead* to define content zones and optimize the search engine's indexation of their sites, with tools such as site maps and a "robot.txt" file.

5.2.5. Project extension

Drawing on the deployment of the *Exalead Cloudview* tool across the civilian Intranets of *CEA*, other entities within the group adopted the solution in response to unique individual needs, like the Cadarache centre for its bibliographic databases. More projects are underway.

5.3. Case 2: A search-based application – Gefco

Gefco is a French logistics specialist, working in the automotive field. It is a large enterprise including 10,000 employees (half of them out of France), with a €3.5 billion turnover and €127 million in operating income, representing 3.6% of its turnover. The firm has a fifty year experience in the industrial sector. *Gefco* can either transport cars from the factory to the dealer or manage the spare pieces.

Gefco possesses a worldwide network and engineering expertise that has helped the firm answer **a large range of requests for transport or supply chain services**. It targets **national or international clients.**

The company provides the following services for industrial players: overland transport, sea and air transport, logistics centre, handling solutions, vehicle (automotive) distribution, or custom and VAT representation.

In order to be able to provide global integrated logistics services, *Gefco* developed ample, complex and rigorous key indicators, which have enabled the firm to provide its customers with observations of performance measured at every stage of the supply chain, as well as to interoperate traceability and logistics systems with the information of customers and partners.

The industrial clients of *Gefco* stretch worldwide and call for *Gefco* to meet their specific strategic requirements, namely permanent gains in competitiveness and quality, increased security and maximum flexibility.

5.3.1. The problems encountered by Gefco

Gefco faces very concrete and important information problems in their activity. This is the reason why the company was looking for an ESS application: information accessibility and sharing is a major resource for quality control and collaborative decisions. The car industry is highly delocalised and relies on just-in-time procedures: therefore, anytime *Gefco* transports an item (a car or a container for instance), the clients need to know where their products are located in real time. *Gefco* wanted to enable its thousands of clients to "track and trace" the 100,000 events per day. Until then, the company had been relying on an *Oracle* database, which managed one million vehicles.

With the increase of new clients and its additional partnerships in new countries (such as Russia or Hungary), the technologies did not fit

the same requirements for the clients anymore, and the increasing delays had become more and more problematic. As a result, the firm had to limit the direct information it dealt with, in order to avoid transactional system damages. The information was updated on a daily basis, which therefore complicated collaborative decisions.

Gefco's mission is to diffuse real-time logistic information. Thanks to the new solution, *Gefco* aimed to easily obtain the three main types of information: tracking, tracing and real-time information. Where is Mister B's car? What was the itinerary used for this car? How many cars of this particular type are in this sector?

5.3.2. The requirements

As we just hinted above, the quality of the logistics and of the information delivered is a strategic asset for *Gefco* since its creation, and the choice of a search solution is a very strategic one. As a consequence, when *Gefco* decided to purchase a new ESS, it explicitly identified the following requirements:

* A simple and ergonomic solution giving real-time positions of vehicles;
* A safe and real-time solution, enabling their partners to take shared and operational decisions;
* A service quality improvement, by reducing delays and by giving updated information;
* An optimisation of the performances with limited exploitation costs;
* Scalability and agility.

5.3.3. The choice process

Considering the limits of their previous track and trace solution, the IT department of *Gefco* found a potential solution thanks to a discussion with the technical services of *Capgemini*, who praised the benefits of an ESS in the reporting and decision-making fields. *Exalead* quickly presented a first model built with software and computing service companies from the *ST*

Group. This first version could manage 100,000 cars and one million events. It convinced *Gefco*. In fact, the simulation driven by *Exalead* enriched the company's ideas concerning the operational reporting services to build.

5.3.4. The implementation

The diagnosis of the project started at the end of 2007,[24] and the official decision to adopt a new ESS was taken in the beginning of 2008. The project was developed during the second and third quarters of 2008. The commissioning took place at the end of the third quarter of 2008. The diffusion of the solution to the thousand users in several countries (among which France, Germany, Italy, and Russia) was planned for 2009.

Once the *Exalead* solution had been adopted and the implementation process had been

initiated, it impacted almost all departments of the enterprise:

- The information system management;
- The commercial department;
- The client support department;
- The accounting department;
- The logistics department;
- Production management;
- Quality management.

Only the purchase department, the marketing and the human resources functions have not been seriously affected by this step of the ESS operation.

The implementation process also had an impact on the operational process of the clients and partners of *Gefco*, given that every actor of the logistic chain shares the same information. The main break to the success of this type of application is the quality of information. *Gefco* invested a lot on this aspect.

Table 15: Project planning: Key elements

	Use			Practical details		
	Weak or none	Based on experience	Formal steps	At the beginning of the project	At the beginning and then punctually	During all the process
Project planning		X				X
Calculation of costs and ressources		X				X
Monotoring and control of budget and costs		X			X	
Project profitability		X			X	
Monitoring and control of quality			X			X

Source: Exalead.

Table 16: Project planning: Responsabilities

	At the origin of the project	Co-Supervision
Executive committee	X	
Information System committee		X
Job committee	X	

Source: Exalead.

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24 Some participants to the project considered *Exalead* stepped into the diagnosis stage too quickly to implement a demonstrator (less than 10 days).

The management of the project proceeded according to the guidelines provided in Table 15 and Table 16.

The project was financially balanced and was finished on schedule. The project was considered as innovating for *Gefco*, and yet, the application was not unstable thanks to the large number of clients using the *Exalead Cloudview* system.

5.3.5. The technology

The architecture of the solution proposed by *Exalead* to *Gefco* did not affect the IS architecture and databases. The major goal of the solution was to get a better service with the same IS. The ESS had therefore been conceived and synthesised as in Figure 22.

Several reasons explain why such a solution and architecture have been adopted. Indeed, the solution provided allows:

- A consolidated vision of the desired information thanks to the search engine;
- Volume performances;

- Search engine internal security management;
- Fast implementation;
- Low infrastructure investment with important expected ROI.

5.3.6. Cost and ROI

As we mentioned earlier, the evaluation of cost is not easy to define. Hence, we do not have any information on the real total cost. We can, however, identify the direct costs. The expected cost of the solution *Gefco* adopted was €700,000 with €450,000 of direct computer costs.

The previous track and trace application had a double infrastructure cost. The company has estimated that the new application eliminates the decision tools used to track transport movements. This divided by two the cost per employee and added a major functional input. The information is now available in fifteen minutes versus twenty-four hours previously. The site availability is 99.98%. Such accessibility of the site urged *Gefco* to improve the quality of information. As a consequence, a project of information quality

Figure 22: Exaleads's architecture for Gefco
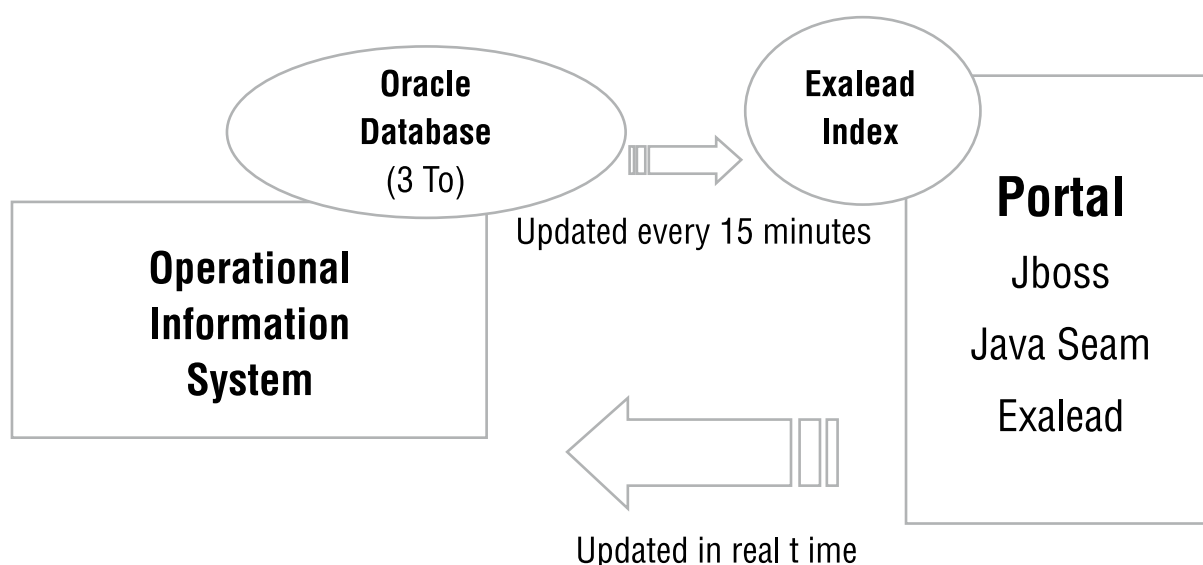
optimisation was set up during the implementation phase, in order to control the quality of information and add new tools (which could locate a vehicle thanks to wifi or GPS technology).

Gefco did not undertake any ROI calculation. The financial objectives were mainly qualitative and concerned the decrease in the number of clients' requests and claims. The new *Gefco* portal supported by the *Exalead* solution contributed to sustain the growth of the firm, but was not linked to the profitability of the firm. As a matter of fact, no measures have been taken to determine the success of the project. This appeared to be very insignificant in comparison to the strategic issue of information sharing with clients. Evaluating the ROI appeared as too artificial.

5.3.7. The future of the project

The project should be extended. The portal will be completed in 2009 with new operational reporting functionalities that will enable the sharing of production data. The company is now working on a similar application for the various factories' logistics of supplying, and plans to extend this project to other activity fields such as spare parts.

5.4. Case 3: The website search activity – Rightmove

Launched seven years ago, *Rightmove* is UK's number one property website. The company is an agency or network of estate agents that acts as an "aggregator". It aims to be the place for UK home movers to find details concerning all properties available to buy or rent. *Rightmove* gathers up-to-date property information and makes it available on the Web for free, twenty-four hours per day. In comparison to other traditional advertising media, *Rightmove* provides more complete information on the number of properties, as well as more details on each property. *Rightmove* is ranked in the Top 20 most popular websites in the UK, in front of well-known brands such as *Yahoo* and *Friends Reunited*.

More than 90% of all UK estate agents have chosen to become a member of *Rightmove* and advertise their properties on its website. This represents well over 20,000 agents and developers, therefore enabling the company to present to its users a very large choice of property.

Rightmove's inventory incorporates details on over 2 million properties. The site processes 400 queries per second and attracts over 29 million visits from active home movers every month, who, all together, visit over 523 million pages.

The company's revenues add up to €40 million, out of which 94% come from advertising services related to the *Rightmove*.co.uk website, with the remaining 6% coming from the supply of business and information services. *Rightmove*'s business model relies on a high-margin subscription-based revenue stream, which is not directly connected to the number of transactions in the property market.

5.4.1. The requirements

Rightmove lists 90% of the properties for sale in the UK and must face 400 queries per second. To retain their advertising revenues, it was essential for them to maintain high-traffic volumes, which therefore required a large and constantly updated inventory. Moreover, they needed a search solution that would allow them to implement their future vision, as well as their current search needs. They wanted to remove the technological barriers that historically limited online searches to only a fraction of their potential, as these were too confusing for the average Web user. Finally, they wanted to avoid a heavy capital investment.

As a result, *Rightmove* wanted a simple, accurate, effective and fast solution, that wouldn't require it to change the layout of the site itself. It therefore identified several requirements, which concern the various components of search engines identified in Part 2.

From a technological point of view, the idea was to remove the barriers that often limit search results (variety of Web interfaces or users' operating systems, for example). *Rightmove* asked for high performance reliability and close integration with their development environment. As a result, the ESS had to be fully integrated into the existing software infrastructure.

Considering the information system infrastructure, *Rightmove* wanted a solution capable of handling very large volumes of data. It also requested a wide range of search facilities and the ability to customize them. The aim was to enable the users to easily refine results with no impact on overall performance.

Economically speaking, *Rightmove* did not want to engage a large capital investment. Until then, they had been using in-house search technologies, but, considering the rapid growth in both visitors and property listings, this solution was not economically efficient. In fact, the main objective of the new solution was to significantly reduce the costs of search, which they actually did, lowering their costs from 0.06 pence to 0.01 pence per query. As *Rightmove* project managers claimed: "by reducing this cost per search, we have been able to invest in more complex search functionalities to better improve the customer experience".

5.4.2. Implementation

The company expected a rapid deployment of the solution and easy administration.

Considering the criteria of the decision procedure we identified above, the main characteristic of the implementation process of *Rightmove*'s project has been the testing stage. In January 2008, *Rightmove* assigned *Exalead* to an intense volume testing in order to ensure the reliability and scope of expansion of the solution. The latter was integrated on the *Rightmove* website in June 2008. This was a successful experience. According to *Exalead*, the project supervisors were "impressed" with the ESS and the "company's tight focus on its core search solutions, which are feature rich and extremely easy to implement." For all these reasons, *Rightmove* decided to choose the *Exalead Cloudview* solution.

5.4.3. User experience

The strength of the ESS platform suggests that, despite the size of the property inventory, navigating around the site to find the perfect property is quick and intuitive, avoiding that users become discouraged and abandon their search. In fact, the assisted navigation system contributes to remove barriers by unifying different sources of information. The *Exalead Cloudview* system automatically creates a customized table of contents based on each search result page, allowing alpha users to further refine their results and explore related topics.

Conclusion

The analysis of Exalead's activity is exemplary as the company provide the full range of search existing search solutions and is one of the dominant players of the Enterprise Search Solutions market.

We analysed three representative cases of search solution implementation. For each of them we detailed the choice process, the requirements, and the deployment and the extension.

We faced the difficulties to estimate:

• the cost of the full implementation considering the sunk cost of users' adaptation
• the return on investment (ROI) when solutions are not implemented for commercial websites

But when the ROI can be estimated, search solutions are very profitable. It is likely to be the same for non commercial purpose solutions.

■ Part 6. Strategic Analysis and Prospects

In this part of the report, we summarize our findings and stress the main perspectives for the ESS market, using the SWOT method coupled with the Pestel model and Porter's five-forces analysis. We conclude with emerging perspectives for the global ESS industry.

The SWOT analysis contributes to identify the existing drivers and impediments (regulatory, technical, economic, or social) that support or hamper ESS development in Europe. This analysis is articulated with the strategic planning model emerging from the value chain analysis, and is used in conjunction with other tools for audit and analysis, namely the Pestel model and Porter's five-forces analysis. Drawing on Opportunity and Threat matrices allows us to assess the probability and impact any factor may have on the industry, all along the value chain of business solutions, from suppliers to customers. In fact, balancing internal and external drivers and inhibitors can help us identify strategic opportunities and moves, therefore enabling us to separate the firm and its products or services from that of its competitors, which is the key to building and maintaining a competitive advantage.

6.1. Introduction

The sustainability of competitive positioning and the viability of business opportunities are continuously evolving. Technical innovations, changes in cost structures, new partnerships and industrial relations, increasing consumer needs, as well as emerging products and services contribute to design a new market structure, form new industries and restructure the existing ones.

For market players, competitive advantage can be obtained by constantly developing existing resources and capabilities and creating new ones in response to rapidly changing market conditions.

Competing companies undertake a wide range of distinct but however interconnected value-creating activities, such as running a sales force, developing new products and services, using technology to provide more information to customers, etc. As a consequence, the firm may be assimilated to a portfolio of core competencies and resources required to produce these activities. According to this perspective, competition is based on the acquisition of skills rather than on the intrinsic value of product: the firm's competitive position calls for the bundling of diverse resources (assets, capabilities, organisational processes, firm attributes, information, and knowledge), rather than the creation of specific products and services. Firms compete on the basis of these unique corporate resources, which are valuable, rare, difficult to imitate, and non-substitutable.

Existing resources and previous strategic orientations influence the different firms' situation. And yet, firms still have multiple ways to position themselves in the marketplace. The positioning and performance of firms are, in fact, determined by their strategic position (market leadership, strategic differentiation, cost structure and business model), as well as by their ability to mobilise a broad range of competencies and/or resources, and by their ability to expand partnerships and alliances in order to reinforce their position.

Drawing on this framework, the purpose of the following analysis is to characterise the key internal and external factors that are important in the identification of the right strategy and in the construction of competitive advantage, which is necessary to achieve the support the development and the strengthening of the search engine industry in Europe.

Table 17: Drivers and threats in the ESS market

	Drivers	Threats
Market	• Rapidly changing technology • New business and pricing models • Development of visualization and GUI • Semantic technologies • Social networks and Web2.0. • Cloud computing	• Continuous flow of emerging technologies • Concentration • Blurring of vertical markets • Uncertain return on technology investment • Flexible technologies and search as commodity
Suppliers	• Strong customer basis and sustainable customer loyalty • Multi-faceted business alliances • Service differentiation and customisation • New pricing models and revenue streams • Integrated and multi-service offering	• Rapid pace of change and ongoing technical challenge • Mergers, acquisitions and take-overs • Strength of competition • Market fragmentation • Multiple/variable contracts with partners and customers • Knowledge of multiple industrial fields • Pricing complexity • Categorical customers 'requirements
Customers	• Scalable and interoperable ESS and IT applications • Focus on information management and services to improve internal efficiencies • Reduced initial investments; costs and budget control • Rapid implementation and fast systems deployment • Security, reliability and flexibility • Technical expertise on search and information + content	• Poor perception of suppliers • Productivity paradox • Rigid offerings and limited number of suppliers • Accelerated obsolescence • Commoditisation of search tools

In order to highlight the main perspectives of the market, we use our previous analysis to go over the main drivers and threats shaping the market and constraining the various actors (suppliers and customers).

6.2. Industry structure: Pestel and Porter's five-forces analyses

The external diagnosis of the SWOT analysis is commonly bundled with the so-called Pestel model and Porter's five-forces analysis. The Pestel model provides a view of the threats and opportunities created by the environment. Porter's five-forces analysis gives a more precise view of the threats and opportunities created by the partners the various enterprises interact with.

6.2.1. The Pestel analysis

The Pestel model is a strategic analysis model focused on six environmental variables, which can affect the characteristics of the market under study. We use the analysis of the preceding parts of this report in order to identify and summarize these six variables and their attributes in terms of opportunities and threats (which may sometimes be similar: the same trend being simultaneously a threat for some players and an opportunity for others). Additional comments and a more critical perspective are developed in the SWOT analysis per se.

The number of threats is low and there are many probable opportunities. This makes this market so profitable. It partly explains the arrival of big firms who were not offering search tools previously. The most important threat for the ESS market is the integration of the of information system which could make disappear the ESS market as an independent market. At the same time the legal aspects are likely to urge a boom in the ESS market.

25 Various cases – whether in the computer, software or telecom industries – demonstrate that competitors may reproduce or mimic such investments.

Table 18: Pestel analysis of the ESS industry

Variables	Probable Opportunities	Possible Threats
Policy	• Technological standardisation and interoperability regulation	• Competitive regulation
Economic	• Market Internationalisation • Software as a service • Alternative business models	
	International economic crisis	
Social	• Emergence of the generation said Y • Growing mobility • Wide users search experience • Communities and corporate social networks	• Growing control and privacy concern
Technological	• Development of semantics and text mining • Fast technological changes	• Embedded search engine business solutions
Environmental[25]	• Pressure on digitisation and online contents • Knowledge management economics	
Legal	• Institutionalisation and legal regulation of shared digital contents and processes	• Traceability and privacy

6.2.2. The five-forces strategic analysis

Porter's five-forces outline is frequently coupled with a SWOT analysis when making a qualitative evaluation of a firm's strategic position. The five-forces model is particularly useful for evaluating, at the industry level, the positive and negative attributes of industry structure and business strategy development. However, for most strategy analysts, the framework is only a starting point or "check-list" they might use.

Porter's five forces include all the elements close to a company that affect its ability to serve its customers and make a profit. A change in any of these forces normally requires the company to re-assess the marketplace and its strategy. While three forces stem from "horizontal" competition (namely, the threat of substitute products, the threat of established rivals, and the threat of new entrants), two forces come from "vertical" competition (namely the bargaining power of suppliers and the bargaining power of customers).

In the following analysis, we detail each one of these forces in the case of the ESS industry, by distinguishing the first period (from 2002 to 2006) from the second period (from 2006 to

2008), as proposed in the dynamic analysis of the market (Part 4).

Force 1: Intensity of rivalry and competition – threats of established rivals

2002-2006:
• Very high growth in industry.
• Wide variety of differentiating capabilities.

2006-2008:
• Mergers and acquisition and smaller number of players.
• Growth stabilisation.
• More difficulties to differentiate.

Force 2: Barriers to entry and threats of new entrants

2002-2006:
• Easier product differentiation.
• Partnerships and network effects not completely established.
• Intensive technological applications.

2006-2008:
• Harder product differentiation.
• Existence of established reputation and brands.

- Partnerships, consortia and mergers creating barriers.
- Emerging technological alternatives (Web 2.0, business-to-consumer search engine applications, etc.).

Force 3: Bargaining power of suppliers

2002-2006:
- Disruptive developments, innovations and high technology.
- Few experienced project/programme managers.
- Large supply and extensiveness of existing solutions.

2006-2008:
- More experienced project managers.
- Concentrating market and reduced alternative competitors.
- Evolving pricing and revenue generation capacities.

Force 4: Bargaining power of buyers

2002-2006:
- ESS handled by chief information officers as part of the information system.
- Low involvement of end users and bad knowledge of search engine applications, unclear attention and acknowledgment of requirements and needs.
- Large alternative suppliers.

2006-2008:
- Mature and experienced users, able to clearly articulate needs and requirements.
- Search technology partly commoditised on the Internet.

- Range of experienced technologies and stabilised sub-markets.

Force 5: Threat of substitutes

2002-2006:
- Strategic advantage technology supporting additional custom developments.
- Low switching costs.

2006-2008:
- First attempts toward standardisation of ESS and wide commodity market.
- Emergence of tailored and integrated solutions.
- Rise of switching costs and complexity of potential substitutions.
- Efficiency focus and cost orientation.

6.3. The SWOT analysis

The economic drivers and challenges influencing the future of search engines in Europe can be made by analysing the strengths, weaknesses, opportunities and threats for the future of enterprise search. This enables us to present a general synthesis of the various analyses we achieved throughout this report.

6.3.1. Strengths

According to the market analysis we presented above, the strongest business assets of the European ESS industry can be identified in the following way.

Table 19: Porter's five forces analysis

	2002-2006	2006-2008
Rivalry and competition	-	+
Entry Barrier	-	=
Supplier power	+	-
Buyer power	-	+
Substitutes	+	=

6.3.1.1. Performance of technological tool and search services

ESS solutions provide an efficient tool to enhance information systems, to increase employees' efficiency and to develop corporate Business Intelligence The incomparable success of *Google* in the basic Internet search field demonstrates the extent to which search tools may be universally accepted and used as the main portals to access information: they have opened the path for similar developments and expansions in business organisations.

6.3.1.2. Quality and specificity of search tools

European ESS providers present a range of unique and distinctive technological resources. Some European suppliers are amongst the leaders of the market (*Autonomy*, for example). Big independents have been able to conceive and develop innovative and efficient technologies for search engines (*Exalead*, *Opentext*). Others are well established as IS platforms in the software industry; they can take advantage of standards, interoperability and integration abilities (*SAP*). Niche players, start-ups and newcomers experience new technological search solutions, using semantic search or Web 2.0 (*Sinequa*), and social networks (*Whatever*, *Bluekiwi*).

6.3.1.3. Broad customer-base and reference users

The growing use of *Google* and search engines in private individual practices has played an important part in enhancing corporate users' skills, transferable to business environments. The various European providers may now benefit from a large experienced and skilled market of users, both on the individual and business side. As a matter of fact, by encompassing a large range of corporate users from different industrial and organisational fields, they can benefit from their knowledge of the various sectors of corporate users to take advantage of the regional market. This growing experience of users contributes to the search standardisation process: it conveys a propensity to unify user ontology, thanks to corporate information systems and generic Internet search engines.

6.3.2. Weaknesses

6.3.2.1. Market fragmentation

One of the most important weaknesses of the ESS industry is the fragmentation of suppliers. As we demonstrated earlier, the ESS market is, to a large extent, characterised by a wide variety of products and services, as well as by a wide diversity of existing firms. Many providers from various sectors are now competing to propose corporate solutions:

- Major and established companies provide applications and the integration of information services, thanks to a common set of infrastructure and standards;

- Large vendors focus on the specific application market: they benefit from standardised interfaces and tools as well as from an expanding market for integrative information services;

- A set of companies regard search solutions as complementary to provide their own processes and functions;

- A bulk of ESS suppliers, many of which are start-ups, target niche products and services.

In this fragmented market, technological solutions and innovation resources are heterogeneously distributed across firms, resulting in different outcomes and different levels of performance. As a consequence, firms face multiple strategic possibilities according to their position on the market, the alliances they establish, and the design of their product and service portfolio. This fragmentation and this dynamic environment have two major consequences. The first is that firms have a hard time leveraging their investments to create valuable and rare resources, which cannot easily be imitated or substituted: any competitive advantage developed by a firm is temporary and unsustainable. The second consequence of fragmentation is that a few market leaders emerge, which are hardly able to mould

the market and the industry. In dynamic markets like the ESS market, technological investments in IT and patented technology do not guarantee competitive advantage.[26] Therefore, firms attempt to develop a unique strategic position, but few of them are really able to influence the industry outcome and indicate to others the shared technological paths and orientations. In this context, small and medium independent firms may try, on the one hand, to differentiate their products and services in order to obtain leadership in a quickly evolving market; on the other hand, others strategies consist in working towards being acquired by bigger firms.

6.3.2.2. Unstable business models

From an economic point of view, another weakness can be identified in moving and unsteady business and pricing models. One can wonder, in particular, how ESS suppliers might generate their revenues from the various existing models: purchase of licence, usage fees, SaaS, or bundling synergies?

The ESS industry faces a more generic situation, already largely observed in the Internet and business-to-consumer services. The pervasive and flexible nature of the Internet has produced a dynamic environment where IT can be easily handled to fit with any kind of innovative strategy, product or service development.[27] This intensifies the proliferation of commodity-type offerings and simultaneous fragmentation of niche segments, as well as the industry competition, the inconsistency of business alliances, and the disorder of transactions and pricing models.

From a strategic perspective, consequences are both economic and managerial. In the first

case, ESS firms fail to maximize their price and revenues over each segment: the proliferation of vendors prevents them from rising the prices according to the willingness to pay of the various customers, while the output of products and services may appear largely undifferentiated. In the second case, ESS providers may face difficulties to sort out the various strategic alternatives and, therefore, could be reluctant to invest in the medium and long run.

6.3.2.3. Broad customer-base and reference users

Another weakness can be identified in one of the strengths of the European ESS industry. A large customer base entails a wide range of industrial and labour specificities, which may be difficult to handle for SMEs. Moreover, in a dynamic technological environment, applications, uses and customers, similarly to requirements, turn to be unstable and quite difficult to monitor in terms of technical intelligence. In such a context, suppliers seek to shape their ESS product and service portfolio in order to offer multiple solutions tailored for various business and industrial environments. This calls for mandatory skills to satisfy a broad customer base, by designing integrated ESS proposals and bundling them with other integrated IS applications.

6.3.2.4. Expertise in emerging technologies and next generation search

We pinpointed above that the market has been characterised by emerging pure players and newcomers supporting disruptive technologies: on such a market, several European companies present themselves as leaders in emerging technologies. This trend, however, may remain marginal if innovative developments achieved on these technologies are handled by independent players only; actually, in this case, innovators may not be able to support large investments and global interoperability concerns. For instance, most firms are currently lacking the resources and scope to support the weight of technological and human R&D investments in semantic treatment, visualization or cloud computing. As a consequence, European

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26 Various cases – whether in the computer, software or telecom industries – demonstrate that competitors may reproduce or mimic such investments.

27 The music industry provides a good illustration of the continuous flow of multiple different solutions existing and commercially experienced to provide music on the market: sales of CD or music subscription, paying or free, bundled with internet or mobile subscription or not, etc. (see Benghozi & Paris, 1999).

incumbents might face difficulties to support new technological developments, to maintain the pace of innovation, and to enhance their own solutions with alternative functionalities.

6.3.3. Opportunities

Several emerging trends have been identified in the previous market analysis. Each one of these trends adds up to define potential resources for economic development.

6.3.3.1. Spaces for innovations and technological developments

Four types of enhancements are now in the core of emerging solutions. They provide opportunities for start-up or innovative incumbents, further contributing to the restructuring of the value chain. Some of these enhancements do not necessarily call for intensive R&D investments. However, they all require a good knowledge of corporate user environments.

- *Categorisation* is the process of organising information of any type (textual or media, structured or unstructured) into related groups. It requires firms to organise (automatically or humanly) their content into well-defined categories dependant on their industry.

- *Linguistic Clustering* examines and measures co-occurrences of words. This statistical analysis or clustering method considers word frequency, placement, and grouping, as well as the distance between words in a document.

- *Semantic Clustering* depends on a particular language and dialect. Documents are clustered or grouped together depending on the meaning of words, using different thesauri, custom dictionaries (such as a dictionary of abbreviations), parts-of-speech analysers, recognition of idioms, etc. Such a linguistic software also analyses the structure of the sentences, by identifying the subject, verbs and

objects, and therefore can provide information on meaning. The roots of the words can also give information on the meaning.

- *Ontology* is used in information retrieval and in artificial intelligence. It defines all the concepts expressed by a single word, and provides a working model depicting the entities and interactions of a particular topic, or a particular industry or domain. It is a way to map a term to multiple meanings.

6.3.3.2. Convergence of search and information system technologies

The first trend we identified is supported by the technological environment technology: ESS have become integrated as part of corporate information systems. These systems, based on search convergence, find their roots in the more global convergence of the software, computing and telecommunications industries. As such, the multifaceted dimension of these systems and their evolutionary environment both open up multiple opportunities for strategic moves. The extensiveness of product and service offerings contributes to increase sales and allow the firms to erect strategic barriers, consisting in specific factors that create disadvantages for new competitors attempting to enter the market, and reducing the foes' ability to compete. Additionally, this makes the suppliers more attractive to consumers and gives them the capacity to provide an additional IS through and from the ESS. This is the case for platform vendors or software suppliers, who can suggest to their IS customers to purchase additional ESS components or push their ESS customers to enrich their applications towards a more comprehensive management of IS.

6.3.3.3. Paired opportunities in oligopolistic markets with a quasi-competitive fringe

In the competitive market we portrayed, with a concentration of larger suppliers and a leaning fringe oligopoly, opportunities are different according to the various players. In all cases, this calls for a strategic structuring of business alliances and partnerships.

The concentration of vendors and the development of ESS services drive the distinct markets of integration tools, development tools, and applications together, possibly around one platform or set of interoperable tools. Accordingly, the larger suppliers have the opportunity to build alliances by seeking partnerships with other IS suppliers in order to package off-the-shelf or standardised and interoperable solutions. This puts the big suppliers in a better position, because they supply platform and middleware tools along with integrated development environments. This is, in particular, the case of blue chip companies like *IBM*, *Microsoft* or *Google*. They conceive and pull together a new mixture of search solutions and information services, articulated to their existing infrastructure products and services. Moreover, they share their standards, promoting business alliances with more specific providers or niche players. In fact, for such large providers, alliances and consortia are required to offer SaaS on an extended basis, in a large array of segments and on additional markets. They can therefore contribute to design the ESS market as a single part of the global market for information systems and computing services.

The involvement of big suppliers leaves room for many smaller and specialised providers, though. The emergence of SaaS and the propensity to handle ESS as a service to provide rather than a product to sell gives SMEs large opportunities. They do not have to invest heavily to compete on technology, but rather can provide customised specific applications appraising their distinctive technology and knowledge of specific users, targeting specific niches and exploring new technological paths, therefore expanding their product and service offerings to reach untapped markets[28] and assimilating standard interoperability as a means to integrate large consortia. In such a

context, challengers have to negotiate intensively to form strategic relationships with major industry players: infrastructure suppliers, software editors and vendors, management consultancy agencies, managed service providers, etc. In fact, entering a consortium and/or a business alliance sounds particularly critical for independent and smaller players that lack the necessary assets, resources and capabilities to provision their products and services without strong partners.

6.3.3.4. Integrated perspective on offering and positioning

Although innovation is driven by technology, required competence to sustain a competitive advantage in high technology environments extends beyond technical expertise. Differentiation is now supported by organisations and new business models, not just technology. In a knowledge economy with information-based industries, innovative solutions arise from the complex interactions between technology, individuals, organisations and environmental factors. No single aspect is sufficient to create a sustainable competitive advantage: value for customers and competitive advantage demand the synergistic combination of all of these dimensions. New business models create value for customers by offering a synergistic combination of the various benefits: technical performance and reliability, quality and compliance of acquired information, speed and availability of the solution, ease of purchase, or unproblematic implementation. Hence, to be an ESS market player requires a firm to be able to integrate, in a balanced way, different types of skills that could transform stand-alone technologies, products and services into a worthy solution.

6.3.3.5. Workforce and mastering of technological resources

As suggested in the case studies presented in Part 5, the implementation process of an ESS and its technical reliability are some of the most important customer requirements. For this reason, developing the workforce of the firm (technical skills, knowledge of user sector and industrial

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28 We can infer, in particular, that ESS and new SaaS business models may play a central role to favour the growing efficiency of small and medium sized corporate users. They offer a fitting model to companies who wish to purchase ESS applications as a "pay as you use" service, on a customised and progressive basis.

sector, project management, and maintenance capabilities) could provide a competitive advantage. The organisation efficiency, however, also depends on human resources management policies that stimulate employee creativity, as well as a trained labour market and an efficient business and social network – all of them being available in the European environment. Necessary expertise and skilled manpower could thus provide high opportunities for European companies.

6.3.3.6. New business organisational designs

Other industrial changes, which are external to the search market, are interesting to underline, as they have an impact on the ESS industry and present interesting opportunities, such as the development of knowledge management in organisations, the emergence of communities and wiki developments in business environments. Social network services are more and more deployed in corporate settings, both internally (to support, for instance, the sharing of best practices between specific employees or workforce, whether salesmen or technical experts), or transversally (to enable experience sharing and to contribute to the professionalisation of similar jobs). Such changes are providing considerable opportunities for new search solutions relying on collective tagging and knowledge sharing, instead of large database management technologies.

6.3.4. Threats

Today, the ESS industry faces several threats and obstacles. We here mention some of them.

6.3.4.1. Market concentration

We already observed that the stabilisation of the ESS industry into a mild oligopoly with a competitive fringe might present, in some cases, positive outputs (Opportunities, Section 6.3.3.): paired opportunities for large as well as small and medium firms. In other cases, the competition and the risk of dominance of larger industry players are significant and contribute to limit the opportunities for smaller players: we demonstrated in Part 4 that the ESS industry has been characterised by a reduced number of players in the last period.

Large recognized ESS suppliers make available their broad portfolios of search service tools, platforms, and services, and are constantly seeking to endorse emerging technologies and to upgrade their existing products. Mergers and acquisitions have now become the means to deal with competition, global expansion efforts, or diversification, to enter new sub-markets, and to increase product and service portfolios or technological range. In a sense, these classic features of a fringe oligopoly constitute a threat for innovative and medium-size companies, as their growth and sustainable development is always questioned. These firms need a successful access to the market and need to build leadership in some way. If they succeed, they then face the risk of being acquired by larger oligopolistic companies willing to grasp their success. The sustainable development of an autonomous fringe remains problematic: infrastructure blue chip companies are entailed to acquire these smaller vendors when they become successful or hold an interesting niche.

6.3.4.2. Commoditisation vs. strategic differentiation

The integration of information systems and search technologies (as described previously in the discussion in Section 6.2.3.1.) has an additional consequence we already mentioned in the case studies. Corporate consumers consider search solutions as ancillary components of information systems: a tool contributing to enhance existing data and information systems and contributing to the global efficiency of the firm. As a result, firm users are reluctant to change their software architecture and to re-build their internal data information centres.

For this reason, we can identify – potential – contradictory loops: large suppliers globalize the market through the mixture of information services, while users consider ESS like an add-on to existing IS. The consequence of this may be market segmentation and increased competition, instead of paired opportunities. In fact, in many ways, the ESS market mimics existing trends on the IT market,

as pictured by several authors, suggesting that an increasing commoditisation may lead to intense competition and price wars. In the ESS market, the large suppliers and those from information services (such as *Oracle* for example) support the commoditisation of ESS: they focus on offering ESS like simple commodity software applications to build a large customer base and generate enough revenues to survive. As for the mid-sized or start-up firms, they offer a wide range of customised and commodity products and services: they seek opportunities to develop new ways to differentiate themselves, and to support the growing autonomy of the ESS market as a niche of information services, with customised search products and services, as well as with growing partnerships with platforms and infrastructure vendors, which could enable them to deliver global IS solutions.

In such cases, differentiation is obtained by exploiting partnerships and alliances in R&D activities, and by the creation of specific valued added features built into commoditised products and/or services.

This phenomenon has consequences on the economic dimension and the generation of revenue, even though a common feature of increasing commoditisation is that buyers select their solution primarily on price. As we hinted

above, pricing is specific to each transaction, which in turn adds complexity. Some ESS suppliers have therefore to develop specific pricing models to recover costs,[29] while others may price ESS on a "marginal cost" basis by bundling them into information service packages. In fact, the cost structure often depends on the range of possible partners involved in the provision of a solution (which may add extra transaction and coordination costs and which may entail higher fixed costs).

In these distinct situations, economists demonstrated that the extensiveness of a product and service portfolio reduces the pricing flexibility of application providers. As a consequence, the only means to avoid price wars is to couple commodities with complex products and services. However, the combination of commoditisation and differentiation has to be considered as a threat for the ESS industry, since commodity-type offerings have ignored the specific requirements of corporate customers, which is why firms may face difficulties to achieve strategic differentiation. Sustaining a customer base with commodity products and services is difficult, therefore suggesting a rapid pace of innovative change and a continuous enlargement of customer bases.

We summarize the previous analysis with the following graph.

Table 20: The ESS market Swot analysis

Strengths	Weaknesses
• Performance of technological tool and search services • Quality and specificity of search tools • Broad customer-base and reference users	• Market fragmentation • Unstable business models • Broad customer-base and reference users • Expertise in emerging technologies and next generation search

Opportunities	Threats
• Convergence of search and information systems technologies • Paired opportunities in oligopoly market with quasi-competitive fringe • Integrated perspective on offering and positioning • Workforce and mastering of technological resources • New business organisational designs	• Market concentration • Commoditisation vs. strategic differentiation

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29 The complexity of producing and implementing a specific product or service increases the ability to change pricing more effectively.

Conclusion

The full strategic analysis and the full study of the different waves of market dynamics (mergers and acquisitions) drove to highlight the numerous opportunities and the few threats for solution providers. The main opportunities are:

- the emergence of Software As A Service as it revolutionizes the way Information System Supervisors manage their information assets,
- mobility which increases the potential of the market,
- regulation which provides new opportunities in terms of e-discovery and use of technology for compliance purposes.

The main threats are:

- the actual crisis which could jeopardize future IT investments,
- the trend of mergers and acquisitions not finished yet which challenges the future of the main providers but also creates good opportunities for those who want acquire new resources

Finally, the opportunities are globally more numerous than the threats and make the market attractive.

■ Conclusions

For a long time enterprise search was limited to the retrieval of basic information embedded in information systems or in enterprise-specific software applications. Up until recently, these tools were seen as too user-unfriendly, too inadequate and too inefficient for user needs in a professional context. As the amount of information within companies grew and the retrieval and analysis of data became an asset for enterprises, search solutions began to emerge in the field of information management. Search tools have been integrated into information management solutions, which have become more and more adapted to business environments, by supporting industrial performance and creation of value.

The previous chapters show that enterprise search is simultaneously driven by the progress in information technologies and by its incorporation into information business practices. The flexibility of information technologies allows relatively easy design of new applications to fit user requirements and labour contexts. This favours a constant flow of changes which alter the boundaries of enterprise search activity over time. Consequently, the enterprise search value chain is also redefined. When the ESS market first emerged, indexing was the most important technological component and a crucial part of its value chain. Today, the weight of importance of indexing has changed. It has become an 'established' building block and market value is now shifting towards components which allow for higher level analysis (e.g. those generating metadata for semantic analysis). For instance, the emergence and deployment of collaborative solutions could contribute to building competence and knowledge through communities of practice. In such collaborative environments, the proper structuring of social expert networks is a strategic element. Well designed structure can partially supplant the efforts in standardisation of databases and the indexing

process. However, how to make best use of such collaborative tools still needs to be decided in practice. There is evidence, for instance, that in some cases, tagging by individual experts delivers a better means of detecting emerging facts and significant signals than collective tagging by communities.

As regards ESS demand, private and professional users are requesting more pervasiveness, search in mobile environments, retrieval of audiovisual and non-textual material, search in unstructured multimedia databases, user-friendly man-machine interfaces, sharing retrieved information within communities of interest, etc. Technology is steadily progressing to provide search solutions that respond to changing uses and business user requirements. Despite this, our strategic analysis leads us to conclude that these technological factors are unlikely to promote structural changes in the market. However, economic factors may, indeed, have a stronger influence.

Since the early 2000s, the ESS market has gone through major development phases and continues to experience considerable growth rates. A number of mergers and acquisitions have contributed to both the consolidation of the market into a small number of big actors and also its segmentation into many niche players. As regards progressive product and service segmentation in the ESS market, amongst the main factors are the many options for responding to user queries, the diversity of client needs and the level of complexity of requested ESS. This also explains the variety of different ESS providers, which range from pure ESS providers, to software providers of existing business intelligence systems, to platform providers. In the future, we expect the ESS market to suffer some marginal changes in its structure, which may lead to slight modifications to the

competitive position of some existing players. These changes may stem both from internal growth (through upgraded products and services, secure activity and strengthened customer base, and specialisation and diversification in specific markets or components of ESS) and from external dynamics (through mergers or acquisitions).

As regards internal ESS dynamics, niche players are in an excellent position to take advantage of the current nature of the ESS market. They are attractive to dominant players, which aim to consolidate their market position by globalizing their offers, and to integrate search technology a as commodity into complete information systems. Niche players, both incumbents and newcomers, can respond more flexibly to customer demands in specific business segments (whatever the segment size, industrial field or organisational function). Usually, niche players do this by providing technological innovations in search components, like add-ons and additional applications supporting interfaces. For niche players, therefore, interoperability with global and broader information platforms is crucial to their business. This pattern is typical for software providers, and our strategic analysis of the ESS market detects no evidence that radical or disruptive change to the internal market structure of pure ESS providers will occur, either as a result of a technological revolution or of the rapid growth of some newcomers.

As regards external ESS dynamics, the situation is different. Some big players in the software and information services domain (such as *IBM*, *Microsoft*, *Google*, *SAP* or *Oracle* in particular) are starting to position themselves in the ESS market. Market penetration may occur in different ways. The first would be the entry of big Internet operators (web search engine providers) and telecommunication companies into the ESS market. As regards telecom operators, their

business models differ significantly from current ESS businesses, as they are based on creative contents and business services conceived by others.[30] Internet operators, on the other hand, are not very active on the ESS market yet, but the expected growth rates and profitability of the ESS business may incentivise them to acquire key ESS providers for integrated solutions in the near future. Another factor for change in market structure could be the growth of ESS players in emerging regional markets (notably China, as has happened in the case of Web search). These competitors may establish themselves as world leaders, taking advantage of their position in large and protected home markets. Nevertheless, they may experience considerable difficulties since clients for ESS applications look for specific requirements, highly reliable solutions and trustworthy maintenance: all of which favour local providers.

Our analysis suggests measures to support the economic health and competitiveness of European ESS companies. These would aim to:

- Consolidate existing small or medium-sized European ESS companies into larger players;
- Establish technical consortia and business alliances involving major European players;
- Support the formulation of technical standards and measures to sustain interoperability, thereby reducing barriers to entry that market leaders could establish through proprietary standards.
- Pool resources for R&D on promising technological choices;
- Provide incentives for specific corporate clients (small and medium-sized users, not-for-profit organisations – government, public agencies, etc.–, or application service providers), which would provide competitive opportunities for European ESS providers.

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30 *Cisco* developed, for instance, multimedia conferencing solutions and other technologies for businesses technologies, which are offered to a range of various telecom providers.

■ Appendix 1: The Vendors in the Enterprise Search Solution Market

The description of most actors striving in the ESS market provides some useful insights on the structure of this market. In this appendix, we separated the actors into two separate groups in order to reflect this structure, and help us understand the dynamics of the ESS market.

Many actors offer enterprise search products or infrastructure. Drawing on the market and value chain analysis we developed in this report, we presented several recurring trends:

- The most influent actors (according to their size and market share) are leaders, which offer the most complete range of products. They are financially powerful and shape the market by way of acquisitions.
- The most promising providers (in terms of innovation or financial power) are, most of the time, newcomers on the market. They are niche players and partners of the bigger firms, which develop incremental innovations.

In order to compare the different actors, we adopted the same structure for each description. We first present the main characteristic features of the provider. We then present the main features of the products they offer. Finally, we list their main clients and the main countries in which they are based.

A1.1. Influential providers in terms of size and market share

Autonomy

Autonomy is currently the largest established enterprise navigation search and retrieval platform vendor.

The company is a global leader in infrastructure software for enterprises and is spearheading the meaning-based computing movement. *Autonomy*'s technology forms a conceptual and contextual understanding of any piece of electronic data, including unstructured information, be it text, email, voice or video. *Autonomy*'s software support the full spectrum of enterprise applications, including information access technology, BI, CRM, KM, call centre solutions, rich media management, information risk management solutions and security applications.

Autonomy targets organisations with information scattered across multiple disparate repositories, in various formats and media. The company's emphasis is on automation. Its meaning-based computing notion enables a better understanding of the relationships between disparate pieces of information, and enables sophisticated analyses, in real time, with limited manual intervention. *Autonomy* has undertaken various business initiatives in order to anticipate customer demand. Its acquisitions of *Virage* and *Etalk* stand out because of both firms' abilities to handle audio and video material, which is increasingly useful as businesses adopt richer media and unified communications and collaboration tools.

The company is profitable, with a net income of $62 million. Its resources are almost entirely devoted to navigation search and retrieval, as they represent 90% of *Autonomy*'s revenue. With its turnover well

over €250 million in 2007, *Autonomy* is now recognized by industry analysts as the clear leader in enterprise search.

Users looking for a platform vendor usually have *Autonomy* on their shortlists and regard it as one of the enterprise search standard. *Autonomy*'s customer base comprises more than 17,000 global companies and organisations (gained in part through its 2005 acquisition of competitor *Verity*), including *ABN AMRO*, *AOL*, *BAE Systems*, *BBC*, *Bloomberg*, *Boeing*, *Citigroup*, *Coca Cola*, and *Daimler Chrysler*, among others. More than 350 companies use OEM *Autonomy* technology, including *Business Objects*, *Citrix*, *EDS*, *HP*, *Novell*, *Oracle*, *Sybase* and *TIBCO*. The company also has over 400 VARs and system integrators. It has customers in every industry and provides vertical applications for e-commerce, energy and utilities, government services, financial services, legal services, manufacturing, media services, pharmaceuticals, and professional services. Finally, it markets and sells search-enabled applications, like *Aungate* for compliance and discovery, or *Etalk* for call-centre applications, through wholly-owned subsidiaries. The company has offices all around the world.

Endeca

After having proven its versatility in various business scenarios, *Endeca* has now established itself as a leading navigation, search and retrieval platform.

Endeca offers *Endeca Search and Guided Navigation* (SM) information delivery solutions[31] for companies who need to integrate, discover, and navigate in enterprise data in order to solve the business problems associated with information overload. *Endeca* solutions empower users to explore and discover relevant relationships in data and find accurate and precise results quickly. This search and navigation technology can be applied to a wide range of enterprise and customer applications, including KM, CRM, customer self-service, analytics, catalogues, directories, and portal integration. *Endeca* is now an *IBM Advanced Business Partner*.

Endeca's strength is based on its efficient platform, which has demonstrated its usefulness in fields as demanding and diverse as product development, sourcing, research, and BI.

The company announced a turnover of approximately €100 millions in 2007, and has approximately four hundred actual customers. Retail firms represent *Endeca*'s largest category of clients, followed by media and publishing companies, manufacturing firms, hospital services, federal governments, financial services, healthcare services, and higher education. Among them are the *Library of Congress*, *In-Q-Tel* (*CIA*), *IBM*, *Barnes & Noble*, *Putnam Investments*, and *Arrow Electronics*. *Endeca* is a privately owned company headquartered in Cambridge, Massachusetts, which also has European offices.

Exalead

Founded in 2000 by European search engine pioneers, *Exalead* is now a global software provider in the enterprise and Web search markets. It offers different kinds of search engines: business-to-business search engines fitted to make available internal content for employees, as well as business-to-consumer search engines fitted to make available the content of an Internet site to the potential consumers. Today, *Exalead*

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31 Endeca technology won the Computerworld's 2003 Innovative Technology Award.

is reshaping the digital content landscape with a platform that uses advanced semantic technologies to bring structure, meaning and accessibility to previously unused or under-utilized data in the disparate and heterogeneous enterprise information cloud. The system collects data from any source and in any format, and transforms it into structured, pervasive, contextualized building blocks of business information, which can be directly searched and queried, or used as the foundation for a new breed of lean and innovative information access applications.

With its innovative technology, its €15.5 million turnover in 2008 and its 80% growth rate,[32] *Exalead* remains one of the most important companies to work in the fields of digital content search, discovery, management, security, and storage. *Exalead*'s worldwide client base includes leading companies, such as *PriceWaterhouseCooper*, *Michelin*, *American Greetings*, or *Sanofi Aventis R&D*, and includes more than 100 million individual users. The company opened offices in USA and mostly in Western Europe.

Fast Search and Transfer

Microsoft acquired *Fast* in 2008. However, the company must be considered as a separate entity, given that it was a leading firm just a few years ago and still works as an independent part of *Microsoft*.

As a search and retrieval platform provider, *Fast Search & Transfer*, addresses three major trends. The first is the desire of media, entertainment, and communications businesses to monetize their digital assets and implement a critical business platform to deliver the Web 2.0 experience. The second is the elevation of search into the core enterprise infrastructure layer in the world's largest companies. The third is the need to combine structured and unstructured information in a new class of intelligence applications.

Before being acquired, *Fast* proved its versatility as an navigation, search and retrieval platform directly with customers, as well as through fruitful relationships with other providers, including OEM relationships with companies like *EMC2*, go-to-market partnerships with *Microsoft* (to extend *SharePoint*'s search capability), and *BearingPoint* (to create search-enabled applications). In the last 24 months, *Fast* has grown from less than 300 employees to more than 700 employees, and has increased its revenue from slightly less than $100 million to approximately $160 million in 2006. The company had a net income of $12.3 million during the 2005 and 2006 fiscal years combined. *Fast* is frequently cited as a short-listed vendor in user selections and as a competitor by other vendors. It has completed approximately 3,500 implementations, demonstrating its greatest strengths in the media, entertainment, publishing, communications, retail, financial services, government, life sciences, and healthcare.

Microsoft

As the centrepiece of *Microsoft*'s move into a range of enterprise software categories, including ECM, collaboration, and BI, *Microsoft Office SharePoint Server (MOSS) 2007* also lies at the crossroads of *Microsoft*'s enterprise navigation, search and retrieval strategy. In fact, the company's overall navigation, search and retrieval strategy is a coordinated approach. It has investments in desktop search with *Windows Desktop Search*, in public Web search with *Windows Live Search*, as well as in enterprise search, either as an integrated part of the full *MOSS* suite or as a standalone server known as *Microsoft Office SharePoint Server for Search*. The company sees its current position as somewhere between navigation, search and

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32 The company had a growth rate of 75% in 2007.

retrieval platforms on one hand, with a measure of control and ability to develop, and navigation, search and retrieval utilities on the other hand, which are typically pre-built, easy to install, and intuitive interfaces for end users.

Representing the "People-Ready Business", *Microsoft* has also devoted a great deal of effort to a navigation, search and retrieval-enabled application, applying navigation, search and retrieval technologies to people search, expert location, *My Site*, and social-networking aspects of *MOSS 2007*. Because of *Microsoft*'s pervasiveness in the enterprise, the company has progressively become a well-appreciated alternative for customers and an undeniable threat to vendors specializing in search. In fact, 85 million end users have access to *MOSS*, which is why enabling search for them is usually just a matter of turning it on. The product also benefits from its integration in other near-ubiquitous *Microsoft* products such as *SQL Server 2005*, *Visual Studio 2005*, *Windows Vista*, *Windows Server*, and *Windows Exchange Server*. Despite the possible threat it may represent to other providers, many vendors and SI see *Microsoft*'s navigation, search and retrieval presence as an opportunity.

Microsoft is a global company with worldwide offices. Its turnover generated by enterprise search is impossible to discern. Today, *Microsoft* claims 4,000 clients enrolled in its *Quickstart for Microsoft Search* partner programme. Platform providers such as *Autonomy* and *Fast* have integrated *MOSS 2007* in their applications, and SI *BearingPoint* has announced an enterprise search offering, namely *SingleView*, which should help companies build custom navigation, search and retrieval-enabled applications.

Coveo

Coveo develops enterprise search engine applications that deliver access to structured and unstructured information across enterprises. The flagship product, *Coveo Enterprise Search*, delivers a unified search engine that searches across all documents and multi-media files located in file systems, databases, enterprise applications, email servers, Intranets, and websites. The *Coveo Enterprise Search* application delivers a combination of out-of-the-box document level security, consumer style ease of use, accuracy based on real-time file monitoring, concept extraction and summarization, as well as fast deployment and minimal administration. The company has integrated *Coveo Enterprise Search* to *SharePoint*.

In 2008, *Coveo* launched the industry's first mobile unified enterprise search application for devices such as the *Blackberry*. This solution takes mobile devices to the next level by enabling fast and secure access into any type of application or data repository, with a single easy to use interface.

Coveo claims over 300 clients, out of which 85% are abroad. Its vast client base includes companies such as *HP*, *Procter & Gamble*, *CA*, *Rabobank*, *PwC*, *Deloitte*, *Nomura*, *National Grid*, *AMN Healthcare*, *Lockheed Martin*, the *NATO*, the *NASA*, and *AC Nielsen*, among others.

DtSearch

The company started research and development in text retrieval in 1988. As a leading supplier of text retrieval software, *DtSearch Corporations* develops, manufactures and sells the *DtSearch* text retrieval product line. The product line is recognized for its "industrial-strength", and ability to instantly search terabytes of text. The *DtSearch* product line includes end-user, enterprise and developer text retrieval products. It also includes publishing capabilities, for publishing large document collections on

websites or CD/DVD. Finally, the product line also includes spidering capabilities for remote sites and distributed search access. As a result, most worldwide companies with document search needs rely on *DtSearch* tools: 4 out of 5 of *Fortune Magazine*'s most profitable companies have *DtSearch* developer or multi-user licenses.

A typical corporate use of the *DtSearch* product line includes general information retrieval, Internet and Intranet site searching, and access to technical documentation. Other corporate uses range from policy manual publishing to email filtering. Important legal, medical, recruiting, and accounting firms are also common users of the *DtSearch* products. For example, in the past two years, *DtSearch Corporations* has sold multi-user network and/or developer licenses to 3 of the "Big 4" accounting firms. On the development side, some of the largest IT companies have embedded *DtSearch* in their commercial applications. In addition, many high-traffic, or content-rich websites rely on *DtSearch*.

Dtsearch claimed a €160,000 turnover in 2007. It has a strong international presence, with sales to over 70 countries (the product line supports international languages, through its Unicode support). *DtSearch* has multiple distributors worldwide, covering six continents.

EMC2

EMC2 provides the systems, software, and services to leverage business data. Their goal is to optimize their clients' information infrastructure to meet growing demands for ECM, security, archiving, storage, and virtualization. As such, *EMC2* offers dozens of products destined for particular sectors and/or given business needs. Its offer is much larger than only enterprise search and comprises compliance solutions, information security solutions, and knowledge workers solutions. It also provides solutions fitted for *Microsoft*, *Oracle*, or *SAP*.

The search solutions provided enable users to navigate dynamically through clustered result sets to discover information. By automating the classification, indexing, extraction, and routing of content, the solutions are said to support reused and policy-based management.

EMC2 earned €13.3 billion in 2007. The company works with organisations around the world of all sizes, in every industry, and in the public and private sectors, from start-ups to the *Fortune Global 500*. Their customers include banks and other financial services firms, manufacturers, healthcare and life sciences organisations, Internet service and telecommunications providers, airlines and transportation companies, educational institutions, and public-sector agencies. *EMC2* also provides technology, products, and services to consumers in more than 100 countries around the globe.

ISYS Search Software

Established in 1988, *ISYS Search Software*'s success can be attributed to its work in document management, records management and email archiving systems. The company's product suite includes applications for desktop search, network search, Intranet search and enterprise search. *ISYS* now offers the possibility for its users to search *Microsoft SharePoint* content, whether they need to index and search *Windows SharePoint* services or integrate advanced search into *Microsoft Office SharePoint Server 2007* (*MOSS*). For *MOSS* searches, administrators only need to set up the *ISYS SharePoint Search Web* component to unlock the full capabilities of the *ISYS* search solution.

Users can search, navigate and discover content instantly, thanks to a variety of tools that enable employees to find information. These tools include: Auto-categorisation for rapid results navigation, entity detection to locate subject matter experts and discover new information, as well as multiple query methods, such as Boolean and proximity search.

ISYS:desktop – currently in its eighth generation, *ISYS:desktop* was first introduced in 1989 as an indexing and retrieval tool for DOS. It has since evolved to become a productivity tool used by organisations worldwide, particularly in government, legal, law enforcement and recruitment.

ISYS:web – also in its eighth generation, *ISYS:web* made its debut in 1996 as a tool designed specifically for enabling search on public websites and intranet sites. The application offers browser-based administration, search analytics reporting, categorisation of results, and a toolkit for integrating the *ISYS* search engine into custom Web applications.

ISYS:sdk – the *ISYS:sdk* provides software developers with the ability to integrate search capabilities into their applications.

Features include automatic categorisation, hit-highlighting and navigation, relevance ranking, multiple query methods, very fast indexing and retrieval as well as a small footprint. It emphasises rapid return and low cost of ownership.

ISYS offers all these capabilities within the *SharePoint* environment, meaning that users never need to leave their portals to perform searches. Often deployed as an Intranet search solution, *ISYS SharePoint Search* assembles single searches across multiple formats and locations, whether the content is in *SharePoint*, a local database or a file located in a different country. Most importantly, *ISYS* supports active directory, in order to guarantee that employees see only documents they're authorised to view.

ISYS has long-standing partnerships with *EMC2*, *Microsoft*, *Interwoven* (now *Autonomy*), *Symantec*, *TOWER Software*, and *Worldox*, among others. *ISYS* serves customers in a variety of fields, including financial services (*Ernst & Young*, or *Deloitte*), law enforcement (*Miami Police Department*, *Las Vegas Metropolitan police*), energy services (*Exxo*, or *Amoco*), and healthcare services (*Blue Cross Blue Shield*). The company has over 10,000 customers on the seven continents, including Antarctica.

Open Text

Open Text was founded on search technology. However, until recently, most of its marketing efforts promoted navigation, search and retrieval within its *Livelink* ECM repository. *Open Text* is now opening up, by offering the possibility to integrate *Livelink* ECM's search capabilities and results within other applications, including *Microsoft SharePoint* and *SAP Enterprise Portal*. It also offers a standalone navigation, search and retrieval platform for search services across internal and external sources, namely *Livelink ECM Discovery Server*, which may act as a foundation for domain-specific, navigation, search and retrieval-enabled applications. *Discovery Server* targets three specific markets: intellectual property, digital media, and legal services. In addition, the company offers applications for energy services, financial services, government services, insurances, life sciences, telecommunications, automotive services, consumer packaged goods, education, manufacturing, and real estate.

New interests in navigation, search and retrieval, as well as its ability to allow integration into established systems in enterprises, is urging *Open Text* to underscore its heritage and expertise in navigation, search and retrieval, especially when the information is unstructured. With more than $400 million in annual revenue (during the 2006 fiscal year), *Open Text* is one of the largest independent vendor devoted to content management. The company has about 300 customers using the *Discovery Server*, not including several hundred installations via its OEM business.

Sinequa

Created in 1984, *Sinequa* has a long experience in search technologies. The company's *Sinequa CS* is a multilingual, linguistic, and semantic search engine for enterprises, packaged with a set of 50 out-of-the-box application connectors. *Sinequa CS* provides many features such as the location of expertise, management of alerts, or sponsored links, among others. Based on a standard technology platform, *Sinequa CS* is a solution that is fast and easy to deploy and readily adapts to changes in the enterprise.

Their partnership tradition is strong. By sharing strategic objectives, developing joint business plans and defining tactical priorities, their aim is to support their partners by bringing them valuable technical expertise and additional industry know-how. They offer intensive training, sales and marketing support and opportunities to develop local market presence.

In 2007, *Sinequa*'s turnover was over €3 million with almost 60% of growth during that same year. Overall, more than 200 customers have adopted *Sinequa CS*, including groups such as *Europ Assistance*, *Materis*, *AtosOrigin*, *Saint-Gobain*, *Bouygues Construction*, *SFR*, *Orange*, *SAGEM Communications*, or *Total*. It has offices in Europe, in the United States and in the mid-east.

Vivisimo

Vivisimo assists enterprises in dealing with the massive information available both inside and outside the organisation. Using competencies in enterprise software and consumer search, the company targets commercial enterprises and government organisations looking for ESS to increase workforce productivity, streamline business processes, raise customer satisfaction, and increase sales.

Vivisimo's product *Velocity* combines characteristics of popular Web search engines and enterprise navigation, as well as search and retrieval platforms with an emphasis on security and integration with corporate data sources. *Vivisimo* is recognized as an innovator in terms of information clustering – a way of dynamically grouping results into relevant topics or subtopics on the external Web. Because they are based on search results rather than on any predefined taxonomy, clusters can show content relationships across sources with varying data and metadata structures. *Velocity* is also frequently used to aggregate and invoke external content, like news sources, to support enterprise decision makers.

Vivisimo has 154 enterprise and government institution customers. Its headquarters are located in the United States and its European offices are in London and Paris.

A1.2. Promising providers in terms of innovation or financial power

Three major types of firm among the promising providers were identified in the value chain analysis and emerging trends part. We first identified the competitors providing 2.0 solutions: they use the features of the Web 2.0 and include collaboration, tagging and ranking in their search applications. We then identified software specialized providers. Finally, we identified platform providers who encourage integration.

Connectbeam

Connectbeam is a one of the leading providers of enterprise social software applications. *Connectbeam*'s architecture and core application (*Spotlight*) were designed to help people across the enterprise connect with the growing pool of information as well as with colleagues having the expertise and experience to help them get their jobs done more intelligently and more quickly. These applications enable this by aggregating the social metadata that is generated naturally by using the Web into a single repository that everyone in the company can access and use. In fact, *Connectbeam* was one of the first companies to link the concepts of social bookmarking and tagging with those of social networking. As such, *Connectbeam* brings the Web 2.0 information-sharing, collaboration, and ease of use of sites like *MySpace* and *del.icio.us* to the daily work-flow of enterprise employees. The company's aim is to help other organisations boost innovation, improve decisions, intensify collaboration, and build critical stakeholder relationships.

Connectbeam was founded by experienced entrepreneurs with decades of experience in the enterprise software market. The company is part of a privately owned venture located in California.

Siderean

Siderean is among the first enterprise providers to employ Web 2.0-style user participation in its approach to navigation, search and retrieval. With an emphasis on usability and navigation, *Siderean* engages end users to refine and improve information access for the community. Based on their professed interests, users can dynamically identify relationships between documents and sets of information, both from internal sources and external feeds. *Siderean's Seamark Navigator* provides information workers with a rich and productive participatory information discovery experience, and helps business owners and their constituents make well informed and timely decisions. *Siderean* seeks to create a sense of community among users, by bringing features like voting, ranking, reviews, and tagging into an enterprise context. Combined with collaboration features like alerting, saved search, and shared search, these features have proven to be particularly appealing for discovery and compliance applications.

Siderean is a privately owned company with 33 live customers in government services, media and publishing, high-tech, and various other industries. The company's office is located in California.

Bluekiwi

Bluekiwi Software is one of the leading European providers of enterprise social software. *Bluekiwi* 2009 is an enterprise social software aimed for people-centric organisations to create powerful and secure social networks and collaborative environments with partners, customers and colleagues. *Bluekiwi* introduces a new and innovative ESS, integrating familiar features of the Web 2.0, such as wikis, blogs, forums, RSS and tagging.

The company's clients include the *SNCF*, *Alcatel Lucent*, and *DHL*, among others. They are located in Paris.

Whatever

Whatever, which is a small European company, uses innovative collaborative technologies to address the growing needs of sharing and managing knowledge at enterprise level. Their main product is called *Knowledge Plaza*. The latter is an easy-to-use, open, flexible and intuitive solution for sharing information and knowledge: a meeting place between those who know and those who search, at the intersection between internal information and external sources. *Knowledge Plaza* empowers users to share and manage Internet bookmarks, documents and files, e-mails, contacts, as well as their own expertise, using facets, tags and contextual search boxes, and offering combined search across many sources. Conceived for searching and browsing, it allows not only faceted search within shared items, thus producing instant directories, it also enables contextual search or on-the-fly vertical search engines.

The names of the customers are not available, but the company claims that it has clients in every fields of activity.

Recommind

Recommind is a leader in sophisticated search, review and analysis software that provides accurate and automated tools, giving people and organisations the information they ask for.

Recommind's accurate and automated concept search software enables users to highlight the information they need. The *MindServer* enterprise search tool combines sophisticated search technology with a simple user interface that both provide accurate results tailored for the information requirements of the organisation. This rule-based access enables organisations to customize results for each user, defining relevancy for users as well as increased control over the display and ranking of information for administrators. *MindServer Search* helps enterprises boost certain search results based on the different properties of a document, including freshness, rank, specific metadata and document length. Search results can feature "Best Bets", which are pre-selected files linked to particular queries.

Recommind's technology is based on federated search, which enables users to search across internal and external data sources with a single query. The extended federated search framework in *MindServer Search* increases user productivity by integrating internal and external results in the same result set and by highlighting search terms in external sources.

In addition to its American offices, *Recommind* has offices in the United Kingdom and in Germany.

DieselPoint

Dieselpoint is one of the leading providers of search and navigation solutions for documents, databases, and XML. The R&D staff started development of the core *Dieselpoint* indexing algorithms in mid-1999, and went live with version 1.0 in mid-2000. Since then, the product has grown to be one of the most sophisticated solutions on the market for applications that require full-text, navigational, and parametric search. *Dieselpoint* redefines the search software market with its Java-based search software. Organisations that use *Dieselpoint Search* empower their end users not only to search data but also to

navigate through data, based on the data's structure and its attributes. This solution represents the second generation of information access for enterprise search.

The company's clients include *HMV*, the *McGraw Hill* companies, *PSS Worldmedical*, *OHSU health*, and *Newview*, among others. Their main office is in the United States.

Google

Google is letting its brand, familiarity among users, and expertise, gained on the external consumer Web, carry it into the enterprise environment. It enables the IT departments to serve various business needs by offering them the simplest means of deployment. To reassure customers on privacy and security matters, *Google*'s initial foray into enterprise navigation, search and retrieval comes via two hardware-software appliances, the *Google Search Appliance* and *Google Mini*, which differ in the number of documents they are able to handle (up to 30 million and up to 300,000, respectively). As a low-cost SaaS offering geared for customer-facing sites, *Google Custom Search Business Edition* feeds the company's appetite for enterprise business as well as its storied desire to index all the world's information. In fact, *Google* has announced additional navigation, search and retrieval SaaS offerings to come. The *Google Search Appliance* and *Google Mini* products demonstrate strength in high-tech, telecommunications, manufacturing, life sciences, consumer packaged goods, healthcare, legal services, governmental services, and education, among others.

While the company generates the vast majority of its revenue from advertising services, *Google*'s rapidly growing enterprise business already generates an estimated $150 million per year. The company has 9,000 live customers, including some in the *Fortune 500* companies like *Procter & Gamble*, *Timex*, *American Express*, *Boeing*, *Fujitsu*, *Hitachi Data Systems*, *Honeywell*, *Xerox*, and *Yamaha*. *Google* has offices worldwide.

Oracle

Oracle Corporation is an enterprise software company. The company develops, manufactures, markets, distributes and services database and middleware software, as well as applications dedicated to business management tools and particularly database management. By 2007, *Oracle* had earned the third largest software revenue, after *Microsoft* and *IBM*. It is mainly known for its flagship product: the *Oracle* database.

Oracle is organized into two businesses: software and services respectively, which are further divided into different operating segments. Its software business is divided into two operating segments: new software licenses, and software license updates and product support. Its service business is divided into three operating segments: consulting, on demand and education. The company's software business represented 80% of its total revenues and its services business represented 2o% of its total revenues during the fiscal year that ended May 31, 2008. In June 2008, the company announced the formation of a global business unit, focused on software applications for the health sciences industry. *Oracle* has offices worldwide and thousands of clients in every fields of activity.

SAP

SAP is aligning its navigation, search and retrieval efforts more directly to its customers' needs and its own unique value. While *SAP*'s navigation, search and retrieval platform, known as *TREX*, has helped

companies manage unstructured information with the *SAP* NetWeaver Portal and other *SAP* applications, *TREX* is not offered as a discrete product, nor is it accessible to developers not using *SAP*. Since 2008, the company offers a navigation, search and retrieval utility called *SAP NetWeaver Enterprise Search Appliance* that allows information workers to easily locate, compile, and use critical business data in the context of *SAP* business processes. This appliance is geared toward extending the usefulness of *SAP*'s business applications for a broader set of workers, especially those not entirely devoted to working with *SAP*. In other words, user queries based on the user's role not only returns information, it also suggests actions and tasks to perform. Hence, clicking on the listed actions brings users to the appropriate location within the appropriate part of the process in the *SAP* business application. This relieves the user from having to launch the specific application and navigate through it to the appropriate record. in fact, from a competitive perspective, *SAP* uses its firmly established position within the enterprise, as well as its thorough understanding of its business processes and contributing data structures, to protect its territory against other navigation, search and retrieval providers. The company serves 39,000 enterprise customers.

Business Objects

Business Objects, which was acquired by *SAP* in 2008, has been a pioneer in BI since the beginning, and is now the world's leading BI software company. *Business Objects* helps the understanding and decision-making for more than 45,000 organisations around the globe, of all sizes. The company provides a combination of innovative technology, global consulting and education services, and the industry's strongest and most diverse partner network.

Business Objects has dual headquarters in San Jose, California, and in Paris, France.

Business Objects acquired navigation, search and retrieval provider *Inxight* in July 2007, adding federated search, high-fidelity extraction, and visualization to its competencies. These added capabilities enable enterprises, governments, and OEM customers to discover, organize, and analyze a growing mass of unstructured information, bring internally and externally managed information into a single view, and visualize large data sets in new and innovative ways. Combined with *Business Objects*' existing data integration business, *Inxight* offers an information integration suite that can extract and transform a wide array of sources, including content in more than 30 languages.

Inxight added approximately 350 new customers to *Business Objects*' 44,000 client base. *Inxight* has also extended the company's OEM business, as it currently offers its patented text extraction capability to ISVs in the BI, search, security, storage, legal discovery, and content management fields.

InQuira

InQuira's goal is to improve customer interactions on the Web and in call centres. The company accomplishes this with products and services focused on a combination of natural-language search and knowledge management tools, that reduce the intent of the user's query and present possible options for resolution. In customer service scenarios, this leads to faster time for problem solving, while in e-commerce scenarios, this improves conversion time. *InQuira*'s search and knowledge base products are tightly intertwined, which is essential for customers that require a quick, cyclical sense-and-respond approach between user queries and provided content. The company's natural language capability is also essential for consumer-facing sites, especially when users tend to express requests and problems in various ways.

The company has approximately 50 customers using its search and knowledge management platform, typically in high-tech, automotive, telecom, and financial services. *InQuira* has offices in the United States and is also located in London.

IBM

IBM has a broad range of navigation, search and retrieval products and services destined for customers looking for quality, scale, breadth of source access, and sophisticated analytics. They include the free, entry-level navigation, search and retrieval utility *OmniFind Yahoo! Edition*, an enterprise navigation, search and retrieval platform based on *OmniFind*, a natural-language-based edition called *OminiFind Discovery*, along with software and service applications geared toward analytics and BI scenarios.

IBM's *OmniFind* serves as a core platform for all these applications. The company partners with several independent software vendors, among which navigation, search and retrieval component providers, to deliver domain-specific and industry-specific navigation, search and retrieval-enabled applications. Frequent issues that are dealt with include customer support, self-service, e-commerce and interactive marketing, quality warning and problem detection, fraud detection and anti-money laundering, life sciences research, government intelligence and anti-terrorism, as well as case management.

OmniFind itself is a mixture of standards, platforms, and third-party products and services still under development, with one of the world's leading service providers, *IBM Global Business Services*, often used to pull them together and customize them for customer needs and environments. *IBM* has also been a promoter and sponsor of standards and open-source efforts related to navigation, search and retrieval, including an unstructured information management architecture, which proposes plug-and-play components to extract concepts and facts, enhance user interaction, and build taxonomies, thus taking advantage of a broad ecosystem of information software vendors and SIs. *IBM* is also actively incorporating the open-source indexing engine *Lucene* into the underpinnings of its *OmniFind* product line.

As it stands today, *IBM*'s navigation, search and retrieval business is simultaneously consolidating and growing. Today, *OmniFind* products and services account for $20 million to $30 million per year. The company has about 300 customers, not including the 20,000 downloads of the free *OmniFind Yahoo! Edition* for enterprise navigation, search and retrieval products. *IBM* typically serves customers in banking and financial services, insurance, government services, energy services, pharmaceuticals, healthcare, manufacturing, transportation, retail, media and entertainment, telecommunications, high-tech, and education.

■ Appendix 2: Enterprise Search Product Description

In the following appendix, we present the main products offered by the firms we described in Appendix 1. This listing provides a comprehensive view of what these firms sell, as well as their price grid.

Autonomy's Intelligent Data Operating Layer (IDOL)

IDOL is a powerful tool for knowledgeable users that have an understanding of how to obtain efficient results from a search engine. *Autonomy* has the reputation of being a deluxe search and discovery engine, which is considered to be quite expensive. One major weakness of the company's offer has been, however, its lack of intuitive front-end user interface. This is reflected in the large number of OEM agreements that the company has, with other vendors having developed front-end applications for *Autonomy*'s technology.

The average selling price for the *IDOL* tool is $375,000.

Endeca's Information Access Platform

Endeca's Information Access Platform is a high-end set of tools, which limits itself to the enterprise market. The company currently lacks brand awareness, which may ultimately make it vulnerable to acquisition. For this reason, the company is currently moving towards BI applications, in order to make its offer attractive to BI vendors wishing to add search to their list of capabilities.

Prices for this platform start at $50,000.

The Fast Enterprise Search Platform

This platform is a functionally-rich product that can be applied to a wide range of uses, and that has been extensively embedded into other products under OEM agreements. The *Fast Enterprise Search Platform* is a high-end tool, which means that it appeals mainly to the enterprise market.

Prices for this platform start at $100,000 and go up steeply from there.

IBM's WebSphere Information Integrator OmniFind Edition

IBM combines the functionalities of *OmniFind* and of *WebSphere Content Discovery Server* to provide a single enterprise search solution that serves the requirements of its users in terms of enterprise search and Web-based searching for e-commerce, customer self-service, and on-line support websites.

The price of the enterprise edition begins at $58,000.

Exalead Cloudview 4.6

Exalead Cloudview is a service-oriented architecture platform, which aims to handle all the data relevant to the enterprises it serves, whether unstructured or structured, and whether it resides on internal

repositories or outside of the firewall and even public websites. It enhances existing classification systems and extracts embedded meanings and relationships to be used in the result navigation system.

Prices for this platform depend on the number of users.

Google Search Appliance

Google continues to develop and enhance its *Google Search Appliance* technology to address the requirements of the enterprise market. However, it competes mostly with *Microsoft* for mid-sized enterprises, where it may eventually take up a large proportion of the *Microsoft*-centric platform market.

The *Google Mini Search Appliance* costs from $2,990 for 2 years and 50,000 documents, and up to $9,990 for 2 years and 300,000 documents. The *Google Search Appliance* costs from $30,000 for 500,000 documents to over $1 million for 30 million documents.

Microsoft Office SharePoint Server (MOSS) and MOSS for Search 2007

The *Microsoft SharePoint Server for Search 2007* has been set up by early adopters of new *Microsoft* technologies, and has since acquired a large market share in its own field. The main difficulty for *Microsoft* is the fact that it only provides solutions for its own platform. Hence, in order to get maximum benefit from the solution, a number of other *Microsoft* products will need to be deployed. This trend provides *Google* with an ideal opportunity to draw potential *Microsoft* users towards its *Google Search Appliance*.

Oracle-Secure Enterprise Search 10g

Oracle offers a large number of services with its *Secure Enterprise Search* (*SES*) engine. The search engine, however, is dependent on other *Oracle* products, which is why it is mainly deployed in organisations that currently rely on an *Oracle* platform. As there is a huge market base of organisations using *Oracle* solutions, there is a very large potential market for the *SES* product.

The price for the *Oracle SES* is $34,500 per processor and $70 per referenced user (with a minimum of 100 users).

■ Appendix 3: Gartner's Magic Quadrant Methodology

The Gartner Magic Quadrant is a proprietary research tool developed by the Gartner advisory firm, providing a qualitative analysis of the market, and a characterisation of the competitors and of their positioning. Even if this evaluation is not based on measurable elements, it still gives a good outlook on the past evolutions and dynamics of the market and therefore can help foresee the coming dynamics of the enterprise search market.

The Gartner Magic Quadrant provides two main outputs. The first one is the positioning of the vendors according to two criteria: completeness of vision and ability to execute. The second output is the typology of market participants displayed into one of the four quadrants: Leaders, Challengers, Visionaries, or Niche Players. The positioning and qualification of players are made on a qualitative basis, using different criteria per category.

A3.1. Positioning the players

A3.1.1. The ability to execute

Product/Service: These elements consist in core goods and services offered by the vendor that compete in and/or serve the defined market. This includes current product and/or service capabilities, quality, feature sets, skills and so on, whether offered natively or through OEM agreements and/or partnerships, as defined in the market definition and detailed in the sub-criteria.

Overall Viability (Business Unit, Financial, Strategy, Organisation): Viability includes an assessment of the overall organisation's financial health, the financial and practical success of the business unit, and the likelihood of the individual business unit continuing to invest in the product, continuing to offer the product and continuing to advance the state of the art within the organisation's portfolio of products.

Sales Execution/Pricing: This corresponds to the vendor's capabilities in all pre-sale activities and the structure that supports them. It includes deal management, pricing and negotiation, pre-sale support and the overall effectiveness of the sales channel.

Market Responsiveness and Track Record: This element consists in the ability to respond, change direction, be flexible and achieve competitive success as opportunities develop, competitors operate, customer needs evolve and market dynamics change. This criterion also considers the vendor's history of responsiveness.

Marketing Execution: This element includes the clarity, quality, creativity and efficacy of programmes designed to deliver the organisation's message in order to influence the market, promote the brand and business, increase awareness of products, and establish a positive identification in the minds of buyers with the product, brand and/or organisation. This "mind share" can be driven by a combination of publicity, promotional, thought leadership, word-of-mouth and sales activities.

Customer Experience: This criterion incorporates the relationships, products and services or programmes, which enable clients to be successful with the evaluated products. More specifically, this includes the ways customers receive technical support or account support. This can also include ancillary tools, customer support programmes (and the quality thereof), availability of user groups, service-level agreements, and so on.

Operations: This element corresponds to the ability of the organisation to meet its goals and commitments. The main factors taken into account include the quality of the organisational structure, such as skills, experiences, programmes, systems and other means that enable the organisation to operate effectively and efficiently on an ongoing basis.

A3.1.2. The completeness of vision

Market Understanding: This is the ability of the vendor to understand buyers' wants and needs and to translate those into products and services. Vendors that show the highest degree of vision listen and understand buyers' wants and needs, and can shape or enhance those with their added vision.

Marketing Strategy: This element defines a clear and differentiated set of messages consistently communicated throughout the organisation, and externalized through a website, advertising, customer programmes and positioning statements.

Sales Strategy: This corresponds to the strategy for selling products that use an appropriate network of direct and indirect sales, marketing, service and communication affiliates in order to extend the scope and depth of market reach, skills, expertise, technologies, services and customer base.

Offering (Product) Strategy: This is the vendor's approach to product development and delivery with an emphasis on differentiation, functionality, methodology and features as defined to meet current and future requirements.

Business Model: This is the soundness and logic of the vendor's underlying business proposition.

Vertical/Industry Strategy: This corresponds to the vendor's strategy to direct resources, skills and offerings in order to meet the specific needs of individual market segments, including verticals.

Innovation: This refers to the direct, related, complementary and synergistic layouts of resources, expertise or capital, mobilized for investment, consolidation, defensive or pre-emptive purposes.

Geographic Strategy: This corresponds to the vendor's strategy to direct resources, skills and offerings so as to meet the specific needs of geographies outside the "home" or native milieu, either directly or through partners, channels and subsidiaries considered as appropriate for that geography and/or market.

A3.2. Portraying the four categories of actors

A3.2.1. Leaders

Leaders demonstrate significant architectural flexibility. They have strong, innovative and broad means to determine the relevancy of results returned to users, and to provide developers with the tools

and the flexibility to tune relevancy settings. They have the necessary financial power to face hard times and sufficient resources to invest in both organic and inorganic technology and business growth. They also have enough depth and strength to serve as platform vendors whose software can be used to solve most information access problems.

A3.2.2. Challengers

Challengers possess the sufficient resources to penetrate the information access technology market effectively. However, they lack the adequate resources to address all information access opportunities. Any of these Challengers could emerge as Leaders, if they invest efficiently in information access technology.

A3.2.3. Visionaries

Visionaries demonstrate imaginative and insightful approaches to the market, but currently lack the resources to prove their leadership and guarantee their future. They all possess architectural flexibility and creative means of establishing relevancy. Greater financial resources and more market traction would however improve their position. Visionaries could become Leaders with stronger market performance.

A3.2.4. Niche Players

Niche Players possess the attributes necessary to fulfil the needs of certain types of information access projects, but they lack the depth and breadth to satisfy a wide variety of projects. In some cases, they lack the financial resources of Leaders and/or Challengers, and cannot demonstrate the depth of vision that indicates they are leading the market. They remain however quite competent for particular sets of needs, as they offer attractive pricing, special capabilities and vertical-market knowledge.

■ Appendix 4: Glossary

Application Service Provision (ASP). ASP is a specific form of Information System outsourcing. ASPs are firms managing and delivering software application capabilities to multiple customers. They provide a contractual service offering to deploy, host, manage and rent access to an application from a centrally-managed facility.

Business Intelligence (BI). BI is a wide range of applications and technologies, gathered from data warehouses and related to decision support systems, query and reporting, business analytical processing, statistical analysis, forecasting, and data mining. It aims to help enterprise users to develop competitive intelligence and to make better business decisions.

Customer Relationship Management (CRM). CRM aims to improve long-term growth and profitability through a better understanding of customer behaviour. More specifically CRM refers to the strategy and processes a company uses to track and organize its contacts with its current and prospective customers.

Enterprise Information Management (EIM). EIM combines Management of Information Systems (MIS), Business Intelligence (BI) and Enterprise Content Management (ECM). It handles them globally, in a business performance and strategic way, by overcoming the specific information technology perspective of information systems.

Enterprise Resource Planning (ERP). ERP consists in a software business system that combines multiple industrial applications into an integrated one, encompassing all facets of the business activities: manufacturing, planning and inventory control, order tracking and customer service sales, marketing, finance and human resources.

Enterprise Search Solution (ESS). ESS corresponds to the search activity when it is related to a business context. It aims at making various types of contents and information existing in an organisation available to authorized employees, partners or contractors.

Graphic User Interface (GUI). GUI applications are programme interfaces that take advantage of the computer's graphic capabilities to make the programme easier to use.

Information technology (IT). IT embraces all the computing technical systems, including hardware, software, applications, communication, network and the Internet. In some cases, authors distinguish it from Information and Communication Technologies (ICT).

Knowledge Management (KM). KM is the process through which organisations generate value from their intellectual and knowledge-based assets. It embraces a range of practices used by organisations to identify, create, represent, share and distribute information in order to develop individual and collective learning and knowledge, as well as to identify and develop best collaborative practices.

Management of Information Systems (MIS). MIS refers to the structuring, organisation, processing, development and governance of information and data: it may include data structuring, knowledge management, computer support, or day-to-day operations.

Return on Investment (ROI). ROI is a measure of the rate of return for industrial projects. It is the ratio of the money gained or lost on a project of investment related to the capital invested. The ROI may be calculated on a single period or on several periods.

Software as a Service (SaaS). SaaS is a particular branch of the software market, where software editors and providers sell to the customers the use of the software as a service (namely on a temporary contract basis), instead of selling full licenses. SaaS are provided by Application Service Providers (ASP).

SWOT (Strengths, Weaknesses, Opportunities and Threats). It is a largely diffused tool for auditing the overall strategic position of a business and its environment. This instrument assesses the Strengths, Weaknesses, Opportunities, and Threats in the process of a project, in a business venture or in any other situation requiring a decision in strategic planning. It suggests to monitor the market surroundings, both internal and external to the company.

Value Chain. The value chain analysis is a concept from business management. It expresses the successive industrial operations and activities required to produce and deliver products and services. Each step is characterised by specific economic actors, competences and added value.

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Abstract

Enterprise search technology retrieves information within organizations. This data can be proprietary and public, and access to it may be restricted or not. Enterprise search solutions render business processes more efficient particularly in data-intensive companies. This technology is key to increasing the competitiveness of the digital economy; thus it constitutes a strategic market for the European Union. The Enterprise Search Solution (ESS) market was worth close to 1,100 million USD (approximately 831 million EUR) in 2008 and is expected to grow quicker than the overall market for information and knowledge management systems (Gartner 2009). Optimistic market forecasts expect market size to exceed 1,900 million USD (approximately 1,435 million EUR) by the end of 2013. Other market analyses see the growth rate slowing down and stabilizing at around 10% a year as from 2010. Even in the least favourable case, enterprise search remains an attractive market, particularly because of the opportunities expected to arise from the convergence of ESS and Information Systems.

This report looks at the demand and supply side of ESS and provides data about the market. It describes the current situation and presents the evolution of market dynamics over the past decade. Our main thesis is that ESS is currently placed at the point where two established markets, namely web search and the management of information systems, overlap. The report offers evidence that these two markets are converging and discusses the role of the different stakeholders (providers of web search engines, enterprise resource management tools, pure enterprise search tools, etc.) in this changing context.

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