

# Expert System

## Interpreting natural language

Initiation of coverage

Software & comp services

Expert System has developed award-winning technology in the increasingly important area of natural language understanding (NLU). Its impressive client base includes a number of national security agencies, UniCredit, Raytheon, 3M, ING Direct, Chevron, ENI and Shell among others and is testament to the effectiveness of its product. Our base case DCF suggests a share valuation of €3.23, but does not take into account the opportunity to expand into a wide range of potential new applications.

Year end	Revenue (€m)	PBT* (€m)	EPS* (c)	DPS (c)	P/E (x)	Yield (%)
12/12	11.6	1.5	4.6	0.0	41.3	N/A
12/13	11.1	0.5	0.8	0.0	237.5	N/A
12/14e	12.7	0.1	(1.0)	0.0	N/A	N/A
12/15e	21.4	1.6	4.6	0.0	41.3	N/A

Note: \*PBT and EPS (fully diluted) are normalised, excluding acquired intangible amortisation, exceptional items and share-based payments. FY12 and FY13 exclude subsidiaries. FY14e and FY15e exclude ADmantX but include Expert System USA.

### Patented semantic network is vital to accuracy

The most important aspect of any NLU system is the accuracy with which it interprets text. No system is perfect and the degree of understanding will vary significantly depending on the application, but Expert System claims to have the edge over other systems with its manually defined and patented semantic network. On a simple categoriser application Expert System reports an accuracy of 85-90% compared to 65-70% for the statistical based approaches used by some of its peers. Our view is that the technology with the best accuracy will be more widely adopted and should also be able to command a sustainable pricing premium.

### Growth boost potential from standardised products

Revenue is generated through a mix of perpetual and recurring licences, consultancy fees and maintenance and support. At the moment the technology is generally provided through an API, which needs to be integrated into the specific application desired by the customer. It is, however, being developed into a standardised platform available on a SaaS model, which should make indirect sales easier and therefore accelerate growth. The ADmantX subsidiary also offers a more scalable SaaS style business model through its app, which is available on advertising platforms AppNexus, Adform and Turn.

### Valuation: Platform solution key to accelerate growth

Expert System is trading at FY15e multiples of 1.8x EV/sales, 9.3x EV/EBITDA and 41.3x P/E. The disparity between the low EV/EBITDA but premium P/E is due to a significant effective tax rate (61%). A normalisation of the tax rate, growth and consolidation of ADmantX and an increase in indirect sales and licences based on a platform product are catalysts for upside in the short to medium term. The long-term opportunity is significant but also more sensitive to potential competitive threats. Our base case DCF produces a valuation of €3.23/share (excluding ADmantX), but the variation from alternative growth rates could be significant.

13 October 2014

Price **€1.90**

Market cap **€42m**

Net debt (€m) at 31 December 2013 5.2

Shares in issue 21.95

Free float 62.5%

Code EXSY

Primary exchange AIM Italia

Secondary exchange N/A

#### Share price performance



% 1m 3m 12m

Abs 7.8 3.8 N/A

Rel (local) N/A N/A N/A

52-week high/low 2.33 1.73

#### Business description

Expert System has developed and patented technology that extracts useful information from unstructured text using semantic-based techniques. It applies this technology to a number of verticals including enterprise search, customer experience management, advertising and big data analytics.

#### Next event

FY14 interim results October 2014

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## Investment summary

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### Company description: Natural language understanding

Expert System has developed proprietary and patented semantic software to extract meaning from text. It can extract entities, relationships, sentiment and categorise the subject matter. It has a variety of potential applications including advanced enterprise search, social media analytics, advertising, customer experience management (eg virtual assistants), communication monitoring, categorisation of content and much more. Its client list includes Vodafone, Shell, Raytheon, ING Direct, UniCredit, Chevron, Eni, 3M and multiple national security services that cannot be disclosed. Its key competitive advantage over other semantic and AI tools is its flexibility and accuracy.

### Significant multi-market opportunity

Semantic technology attempts to extract meaning from text rather than simply looking at the keywords that the sentence contains. The semantic search and analysis market is still in a relatively early stage of development but Expert System is already profitable and cash generative in its domestic market with significant room for growth internationally. It has recently opened offices in the UK and is expanding offices in the US. We see the key to growth being the success of the sales and marketing effort and the introduction of a SaaS-based platform solution that will simplify implementation and allow more scalable growth. The core applications of enterprise search, customer experience management and semantic advertising are each significant market opportunities and therefore the sensitivity is in execution and success of the platform product.

### Valuation: 1.8x FY15 EV/sales, 9.3x FY15 EV/EBITDA

Given its high growth potential, Expert System is trading at a very reasonable 1.8x EV/sales and 9.3x EV/EBITDA (FY15e). FY15e P/E is a more expensive 41.3x, which is largely due to a significant effective tax charge (61% in FY13), which we forecast to continue into FY14-15. The tax charge should come down as more revenues are generated outside Italy. There are a number of uncertainties that could affect future profitability and revenue growth and therefore we have performed a DCF valuation and sensitivity analysis to obtain a range of potential valuations. Assuming revenue CAGR of 21% to 2024 and excluding ADmantX, our DCF produces a valuation of €3.23. The key sensitivity is the rate of customer growth, which is likely to be heavily dependent on the success of the platform product that simplifies and automates integration with client systems and enables an effective SaaS business model. Such a model has the impact of improving both the margins and the potential growth rate for Expert System and is therefore key to significant share price upside. Our DCF valuation assumes that the SaaS model is successful.

### Sensitivities

**Competition:** There are a number of large companies working on NLU solutions and although Expert System has patents protecting its implementation, other companies may develop alternative approaches that are as effective. **Changing business model:** Expert System's business model and revenue structure will change as it enters new markets and develops new products and therefore it is very difficult to forecast financials with a great deal of accuracy. **Lumpiness of revenue:** At the moment most revenue is generated from custom development work and therefore large projects can have a significant impact on performance. **Reporting and regulation:** Expert System reports using Italian GAAP under AIM Italia regulations, which until recently has not required consolidation of subsidiaries. Historical results are therefore for the parent company only. Recent changes to AIM Italia regulations may require consolidation in FY14. **Exchange rate:** With its expansion into the US and the UK, Expert System has become more exposed to fluctuating exchange rates, although this is somewhat hedged by operating locally-based offices.

## **Company description: Understanding natural language**

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Expert System has developed software that extracts meaning from unstructured, text-based natural language by understanding the components of a sentence and the context in which the text is appearing. It can identify the components of sentences (ie nouns, verbs, object, subject) and extract entities, relationships, sentiment and subject matter automatically. Creating software that has natural language understanding (NLU) capabilities is a key part of the Artificial Intelligence (AI) problem-set and an effective solution is likely to be transformational to almost every industry. Expert System's core technology is called Cogito and has already been applied to a number of industries including advertising, publishing, security services, corporate search tools, customer experience management and virtual assistants.

### **From spelling and grammar check to NLU**

Expert System was formed in 1989 and developed a program called Errata Corrige, which was used as a spelling and grammar check tool in Word after Expert System licensed to Microsoft in 1994. It then started developing the Cogito technology, which was focused on business applications such as enterprise search tools and entity and relationship extraction. The Cogito technology was patented in the US in 2007 and a US subsidiary was established in 2009. The advertising subsidiary (ADMantX) was formed in 2010 to apply the Cogito technology to online advertising, which it obtained a patent for in 2013.

### **Transformational technology**

NLU technology has a broad range of applications, which will expand even further as the technology develops. Exhibit 1 describes Expert System's current product offering. The technology is provided through products and an application programming interface (API) either through the cloud or on premise, which means it can be easily integrated into third-party applications. Expert System currently generates revenue through perpetual and recurring licences (both perpetual and recurring licences vary significantly in size but are typically based on volume usage), maintenance and support and project fees. The largest proportion of revenue currently comes from custom implementations for clients based on the core API. Search and information management is one of the most popular products along with the intelligence and security product set but customers can choose a combination of the tools. Gartner has recognised Expert System in its Magic Quadrant for the second time in an improved position in the enterprise search market. Being included in the Magic Quadrant is a further indicator of the quality of the technology, and the improved positioning from just entering the quadrant in 2013 to being in the top 10 in 2014 on its combined 'ability to execute' and 'completeness of vision' shows it is moving in the right direction. It is likely to improve further following the IPO, which has provided funds for execution and investment in new products.

### Exhibit 1: Expert System's solutions offering

Solution	Description
Search and information management	Makes it easier to find and identify relevant information by categorising and understanding content through semantic tools. It allows users to search by concept rather than keyword, and find closely related information. Expert System's tools are compatible with Microsoft SharePoint and other major document and content management platforms.
Text analytics	Analyses text and extracts entities, concepts and the relationship between them. Relationship extraction is one of the key benefits of this technology because it can be used to quickly and easily identify relationships between people and organisations.
Intelligence and security	Analyses publicly available information (ie websites) to alert the customer of key news and information related to its business. The Cogito software can analyse thousands of sources in real time and extract useful and relevant information. In theory this should significantly reduce the effort required by the customer to find and interpret relevant newsflow.
Automatic categorisation	Content is automatically categorised using the semantic network to determine the classification of content within a document. This helps improve navigation and searchability without having to manually categorise content. Expert System has a number of media clients that use this technology to automatically categorise news content and add metadata to articles to improve search engine search relevance.
Taxonomy and ontology management	Taxonomy when applied to websites relates to the way content within websites is classified. Ontology is the classification of concepts within a specific knowledge domain. Expert System's semantic tools can be used to build and maintain taxonomies and ontologies to allow efficient structuring of information.
Customer interaction management	Enables natural language interaction with customers. The specific implementation varies, for example IWBank uses Expert's semantic technology as the intelligence behind its online virtual assistant. Using semantic technology in this way helps to improve efficiency by helping the customer find the answer to their questions automatically thereby reducing the number of calls that need to be managed by a call centre.
Social media monitoring	Monitors social media for comments about the company or brand to alert management if there is a brand damaging (or enhancing) trend developing. The tool analyses social media in real time to alert management quickly with limited (if any) manual intervention. It can also be used to provide the company with more information on brand perception.
ADmantX	ADmantX is a separate subsidiary and was formed to apply the Cogito technology to online advertising. It uses sentiment analysis and categorising aspects of the Cogito tools to identify websites that are appropriate for advertising specific brands and products. The advertiser will use the ADmantX service to query whether the website it is targeting is appropriate for its product. Usage is charged on a per-query basis. ADmantX tools are available as an API on a SaaS model and as an app in ad-platform AppNexus.

Source: Edison Investment Research, Expert System

## Wide opportunity, but focused on core sectors

Since Expert System's technology is applicable to many sectors and new applications are being developed all the time, the business model and strategy will change as the number and nature of applications grows. Customers are split over a number of sectors including intelligence services, banking, advertising, telecoms, journalism and many others. The focus, however, is on enterprise search within the oil and gas and financials industries, and custom undisclosed services for the intelligence services. Revenue is also split globally with a high proportion from the US and Italy. Gartner estimates that the global enterprise search market was worth \$1.7bn in 2013 and will grow at a CAGR of 11.2% to \$2.6bn in 2017. Within this global market Expert System has a number of clients in the oil and gas, financial services and intelligence services verticals, which are a significant component of the overall market. The US was the largest geography but Europe is expected to be the fastest growing.

## Building a platform for easier integration with client solutions

At the moment Expert System's technology (known as Cogito) is implemented using an API that requires developers (either internal to Expert System or third parties) to integrate it into the client systems. At the moment Expert System mainly uses its own engineers but as the market develops it is hoped that third-party integrators will become a more significant sales and distribution channel and therefore operating margins should improve. To help achieve this Expert System plans to build the technology into platforms based around specific applications to make integration easier. Cogito can already be integrated into Microsoft SharePoint and Apache Solr. In addition, it is working on an undisclosed new product for Google Search Appliance that could help further boost growth.

## ADmantX – improving targeting of adverts

ADmantX is a subsidiary of Expert System that is focused on providing semantic solutions to the advertising market. Its purpose is to provide advertisers with software tools (as SaaS) to automatically determine whether a website is appropriate to display an advert for its products. This is useful because of the growth in advertising networks, exchanges and real-time bidding (RTB)

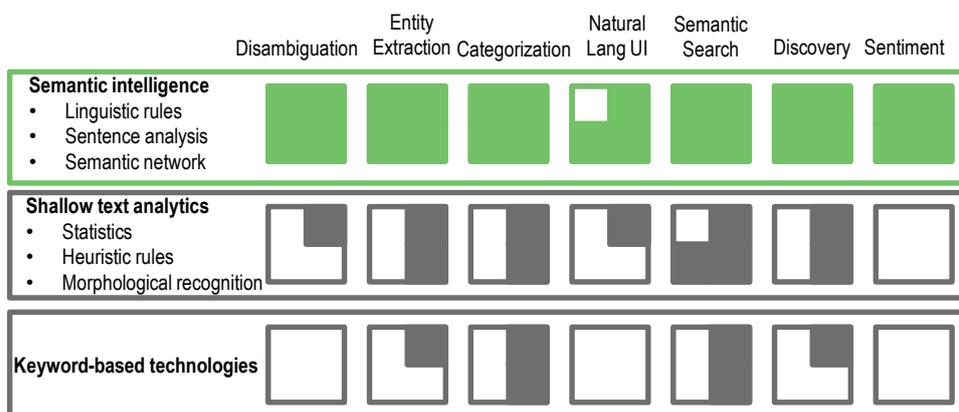
that automatically place adverts on a wide range of websites. Typically the websites can be selected using a number of factors including keywords, location of viewer, the information in cookies or the type of browser being used. ADmantX hopes to improve the targeting by providing semantic analysis of a webpage. Management claims ADmantX can improve the click-through rate (CTR) by 85-120% and as a result ad networks can charge a premium and increase the cost per mille (CPM) by 30% or target more volume by keeping costs lower but providing a better quality service. The software is provided as an API and apps on advertising platforms such as AppNexus and Turn on a SaaS basis. ADmantX is a 71%-owned subsidiary of Expert System with 21% of the remaining shares owned and controlled by Atlante Ventures, an Italian VC fund, and the remaining 8% by various minority shareholders. The subsidiary was formed in 2011 and the product became commercially available in 2013. Revenues are still relatively small but it has the potential to grow quickly given the size of the advertising market and the cloud-based interface. The servers that are used to provide the service are also cloud based and can therefore scale linearly with usage. Pricing is based on the number of queries per month and profitability is expected in FY16.

## Semantic technology

### Semantic vs statistical

The semantic approach to NLU attempts to extract meaning from natural language by understanding the structure of language, whereas the statistical approach extracts meaning from just the words used. The main advantages of the semantic approach are that it more accurately interprets new information and it is easier to adapt the model to a specific knowledge domain. The advantage of the statistical approach is that it is quick to build the repository of information and to analyse a new block of text. Exhibit 2 shows a summary of the performance of semantic analysis compared to statistical and keyword-based approaches. The semantic approach performs better across all areas but particularly in sentiment analysis.

**Exhibit 2: Technology comparison**



Source: "Semantic technology: what it means and why it matters" Expert System

### Knowledge domain, speed and flexibility

As with human-human communication, computers require knowledge of the specific domain that they are expected to operate in. One of the key advantages of Expert System's semantic technology over simple statistical based approaches is that it is easier to manually incorporate and adapt semantic rules and taxonomies for varying knowledge domains. The structure of Expert System's semantic network is split into concepts, attributes and relations. It has two million concepts, several million attributes and over six million relationships in valuable knowledge areas such as oil and gas, financials and healthcare. Expert System claims the closest competitor (for

manually developed semantic networks) only has 150k concepts in its network and management estimates that a domain of 100 concepts would take two days to put together by an engineer. This implies it would take 40,000 person days to duplicate the network. As a rough guide it also estimates that Cogito semantic technology has a precision of 85-90% whereas statistical-based technology has an accuracy of only 65-70%. Speed of processing is the other factor that needs to be considered for NLU. Expert System claims that its technology is twice as fast as its equivalent semantic peers due to its patented semantic network structure. Statistical-based technology is much faster but at a cost of reduced accuracy, especially in niche knowledge domains. Cogito semantic technology can process 40kB/s whereas statistical-based tech can process 300kB/s. The key factors preventing third parties developing similar systems are the patents that Expert System has around its semantic network and the time it would take to duplicate using a similar manual approach. An alternative automated approach could be developed, but this is unlikely to be easy given the inherent difficulty in making machines understand natural language.

## **Compelling value proposition**

All effective NLU tools have a compelling value proposition as they can improve the efficiency of, and in some cases replace, expensive staff. A European bank case study from Expert System reports that the implementation of Expert System's semantic search function across its intranet and website resulted in a 5% reduction in customer call centre costs and a 38% increase in cross-selling of products. The website had 70,000 daily visitors and after the implementation of Expert System's technology 1,150 queries per day were resolved without the need for a call to the call centre. This resulted in an annual saving of approximately \$2.2m. Being able to clearly demonstrate cost savings in this way should help drive adoption and give Expert System more pricing power.

## **Competition**

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Many companies have identified natural language understanding and artificial intelligence as an important area for development and therefore there are numerous people working on solutions with varying approaches. Exhibit 3 lists some of Expert System's competitors and Exhibit 4 compares the functionality offered by each peer.

## **Performance is critical**

Although there are multiple organisations working on NLU and AI, the range of potential applications is so broad that companies can develop a protectable niche within specific industry verticals and product areas. Expert System provides products for undisclosed applications in the intelligence services, and enterprise search tools and customer experience management for a number of other sectors including oil and gas, financials and telecoms. Operating within these specific product areas provides an element of protection from competition since it helps Expert System increase its depth of knowledge and expertise within those areas, which will increase the difficulty for others to compete in terms of quality. We view accuracy and quality of the product as key to uptake and therefore the depth of experience and knowledge domain expertise can be a strong barrier to competition. The work and cost required to switch suppliers of NLU software could also provide some protection against competition. Once a customer has integrated Expert System's software into its solutions it will take time and effort to replace it with another system, which dis-incentivises change. However, the risk of a third party developing a more accurate solution can never be completely discounted.

### Exhibit 3: Peer comparison descriptions

Company name	Description
AlchemyAPI	AlchemyAPI provides similar tools to ES but also provides automated image analysis and classification. It is used by over 40k developers, with more than 3.5bn API calls processed each month, and can process thousands of documents per second. 90% of API calls are from paying customers and it supports eight languages. It is a private US-based company.
Daedalus	Daedalus is a private Spanish company specialising in the extraction of meaning from text. It provides a similar range of products to Expert System including search, virtual assistants and content classification. It also provides advanced text proofreading. Its core products are Textalytics (Semantic API tools), K-Site (multi-media management for corporate customers), Stilus (multilingual proofreading tool) and Sentimentalytics (browser plug-in that analyses information on social networks).
Basis Technology	Basis technology is a US-based private company that provides software for extracting meaning from multi-lingual text. Some of its key customers include Amazon, Google, Microsoft, HP and Lockheed Martin. It also provides Asian linguistic technology to Ask.com, Google, Microsoft Bing and Yahoo!. Its solutions include e-discovery, multilingual search and social media monitoring. Technology is based around statistical machine learning techniques but also uses manually developed lists for entity extraction. It also offers digital forensics solutions.
Lexalytics	Lexalytics provides solutions for enterprise search, social media monitoring and the extraction of meaning from unstructured data. Its customers process over 3bn documents per day. The functionality it provides includes sentiment analysis, content categorisation, named entity extraction, context extraction and summarisation. Technology is based on "deep learning" techniques that use Wikipedia as a basis.
Nuance Technology	Nuance provides a range of technologies and products around voice recognition and natural language understanding, including virtual assistants. It also offers development tools to enable app developers to integrate Nuance's functionality into third-party apps. Currently the development platform is focused on the medical space, but it is likely to be expanded. Nina is the virtual assistant and can be used in 38 languages.
Attensity	Attensity provides solutions for the analysis of social media and customer feedback using natural language processing and semantic understanding. Its headquarters are in Redwood City, California, with offices in Salt Lake City, Belgium, Germany and the UK. Customers include AT&T, Yahoo!, eBay, ASDA, Verizon Wireless, Deutsche Telekom, Lloyds Banking Group and Nokia. The technology uses a mix of search, natural language processing, machine learning, artificial intelligence and semantics. It is very much focused around social media analytics.
Clarabridge	Clarabridge is a US-based private company that provides a number of tools for the analysis of social media and customer feedback. The core NLP engine is available in 12 languages and provides sentiment analysis and categorisation of social media content to help analysis. Products are centred around customer experience management. The highest use package sells for \$80k/month for 100m annual queries. The most popular is the \$28k/month 10m annual feedback records. Customers include Sage, US Bank, Best Buy, Acer, Wendys, Dell and a number of other undisclosed international companies.
Sinequa	Sinequa is a French headquartered private company with offices in the US, UK and Germany. It focuses on customer analytics and feedback, unstructured data categorisation and search. Its customers include Astrium, Atos, EADS, Airbus, AstraZeneca, Total, Solvay and Siemens. It has 250 clients worldwide. It claims its technology is more resource efficient and that competitors require 7-10 times more computing resources. It also has speech to text and optical character recognition functionality. The tools are focused around business analytics rather than semantic understanding.
TEMIS	TEMIS's natural language processing technology is branded as Luxid. It is divided into three areas: Luxid Annotation Factory (entity and relationship extraction), Skill Cartridge Library (domain specific feature extraction) and Luxid Content Enrichment Studio (development tools to customise and extend functionality).
Dassault Systemes	Dassault Systemes' Exalead product provides enterprise search and web search tools using semantic technologies. Dassault Systemes acquired Exalead for c€135m in 2010. In the press release after the acquisition Dassault claimed that 100 million people a month use Exalead for information search, access and reporting. Its Netvibes platform performs social analytics.

Source: Edison Investment Research, company websites

### Exhibit 4: Product comparison

Company name	Sentiment analysis	Search/categoriser	Entity extraction	Audio/image/video	Social media	Virtual assistance	Auto tagging	API
<b>Expert System</b>	●	●	●	✘	●	●	●	●
Alchemy API	●	●	●	Image	✘	✘	●	●
Daedalus	●	●	●	✘	●	●	●	●
Basis Technology	✘	●	●	✘	●	✘	✘	✘
Lexalytics	●	●	●	✘	✘	✘	●	●
Nuance Technology	✘	✘	✘	✘	✘	●	✘	●
Attensity	●	●	●	✘	●	✘	●	✘
Clarabridge	●	✘	✘	✘	●	✘	✘	✘
Sinequa	✘	●	✘	Audio and video	✘	✘	✘	✘
TEMIS	✘	●	✘	✘	●	✘	●	✘
Dassault Systemes	✘	●	✘	✘	●	✘	✘	✘

Source: Edison Investment Research, company websites

## Client list as a quality indicator

Although it is impossible to independently quantify the relative performance of Expert System's products compared to those of competitors, the client list gives confidence of the quality of Expert System's solution. It currently works with Raytheon, Vodafone, BlackBerry, ING Direct, Shell, Chevron, eni, UniCredit, 3M and others including many national security services whose names cannot be disclosed. Expert System's technology can also be integrated into Microsoft SharePoint

and Cloudera Enterprise and it is a partner with IBM for CRM tools. It is also working on an undisclosed new product for Google Search Appliance.

## Management

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Expert System has an experienced and technology-focused management team, many of whom were the original founders. Stefano Spaggiari (CEO), Marco Varone (CTO and chairman) and Paolo Lombardi (R&D director) helped co-found Expert System and all have computer science degrees from the University of Modena. Stefano also holds an executive MBA from the Alma Graduate School of the University of Bologna. The management team also has experience in building start-ups; Marcello Pellacani (VP, Enterprise Division) and Andrea Melegari (COO, Intelligence Division) founded web software developer ExpertWeb, which was sold to Italian internet services company Banzai. Luca Scagliarini (VP strategy & business development) helped found and launch ADmantX in 2010 (within Expert System), where he previously served as CEO, and holds an engineering degree from the Politecnico di Milano, Italy, and an MBA from Santa Clara University, California. Luigi Paraboschi (EVP corporate development) held various executive finance positions at HP, in its Personal Systems and Imaging and Print Group. We believe this combination of skills and experience in the senior management team, along with the presence of a number of the original founders, is a strong positive. In relatively early-stage tech companies such as this we believe a strong and technically adept management that is aligned to shareholder interests (as we believe they are here) is key to growth in shareholders' returns.

## Sensitivities

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- **Competition:** There are many companies and researchers developing AI and NLP solutions. The best performing product is likely to vary depending on the specific application but it is impossible to predict with a high degree of assurance what the leading technology will be. The impressive customer base that Expert System currently has in the security services, oil and gas and financial services fields is a good indicator that it is currently one of the top performers in those fields but this could change if peers release new, more competitive products.
- **Changing business model:** Expert System's business model and revenue structure will change as it enters new markets and therefore it is very difficult to make financial forecasts with a great deal of accuracy. The investment case, however, is based on the potential of the technology and the market opportunity and therefore short-term forecasts should not form the basis of an investment decision.
- **Lumpiness of revenue:** At the moment most revenue is generated from custom development work and therefore large projects can have a significant impact on performance. The proportion of revenue generated from these types of projects is expected to fall over time as licensing revenue increases and recurring maintenance and support contracts grow.
- **Reporting and regulation:** Expert System reports using Italian GAAP under AIM Italia regulations, which until recently have not required consolidation of subsidiaries. Historical results are therefore for the parent company only. Recent changes to AIM Italia regulations may require Expert System to report fully consolidated results in FY14.
- **Foreign exchange:** With its expansion into the US and the UK, Expert System has become more exposed to fluctuating exchange rates. At the moment, most revenue comes from Italy so the impact is relatively limited, but as the US business grows it will become more significant. It will be partially offset by US based expenses so the sensitivity may be largely a translational risk rather than operational.

## Financials

### Historic reported results are unconsolidated

Expert System was admitted to AIM Italia on 14 February 2014 raising €9.8m at an offer price of €1.80. Financials are only available back to 2011 and Expert System follows Italian GAAP under AIM Italia regulations, which have not historically required consolidation of subsidiaries and therefore the reported results only include the parent company. However, AIM Italia rules have recently changed and therefore Expert System may be required to consolidate all subsidiaries from FY14 onwards. Management is evaluating the impact of the regulation changes at the moment. The two main subsidiaries are Expert System USA Inc and ADmantX Spa. Exhibit 5 is a consolidation based on information provided by management but may not take into account all consolidation adjustments that may be necessary in the full accounts. Figures for 2014 and 2015 are our own forecasts. Forecasts for ADmantX are based on management's forecasts.

<b>Exhibit 5: Consolidation summary (€m)</b>					
<b>Revenue</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014e</b>	<b>2015e</b>
Expert System SPA (exc grants)	10.3	11.5	10.6		
Grants and other	0.0	0.1	0.5	0.7	0.9
<b>Expert System SPA (reported)</b>	<b>10.3</b>	<b>11.6</b>	<b>11.1</b>		
Expert System USA Inc	0.5	1.7	0.7		
Intercompany adjustments	0.0	(0.9)	(0.5)		
<b>Expert System Consolidated group (inc grants)</b>	<b>10.8</b>	<b>12.3</b>	<b>11.3</b>	<b>12.7</b>	<b>21.4</b>
ADmantX		0.1	0.5	1.2	3.6
Intercompany adjustments		(0.2)	(0.1)	0.0	0.0
<b>Total group revenue</b>	<b>10.8</b>	<b>12.3</b>	<b>11.7</b>	<b>13.9</b>	<b>24.9</b>
<b>Total Expense</b>					
Expert System SPA	(10.7)	(12.9)	(12.4)		
Expert System USA Inc	(0.6)	(1.5)	(1.5)		
Capitalised costs	1.9	3.1	2.3	3.0	2.4
Intercompany adjustments		0.9	0.5		
<b>Expert System Consolidated group</b>	<b>(9.4)</b>	<b>(10.4)</b>	<b>(11.2)</b>	<b>(12.2)</b>	<b>(19.4)</b>
ADmantX		(1.6)	(2.0)	(2.0)	(3.7)
Intercompany adjustments		0.2	0.1	0.0	0.0
<b>Total group expense</b>	<b>(9.4)</b>	<b>(11.8)</b>	<b>(13.1)</b>	<b>(14.2)</b>	<b>(23.0)</b>
<b>Operating profit</b>					
Expert System SPA (reported)	1.5	1.8	0.9		
Expert System USA Inc	(0.1)	0.2	(0.8)		
<b>Expert System Consolidated group* (inc grants)</b>	<b>1.4</b>	<b>2.0</b>	<b>0.1</b>	<b>0.5</b>	<b>2.0</b>
ADmantX	0.0	(1.5)	(1.5)	(0.8)	(0.1)
<b>Group Total</b>	<b>1.4</b>	<b>0.5</b>	<b>(1.4)</b>	<b>(0.3)</b>	<b>1.9</b>
<b>Group Total (exc grants)</b>	<b>1.3</b>	<b>0.4</b>	<b>(1.9)</b>	<b>(1.0)</b>	<b>1.0</b>

Source: Edison Investment Research, Expert System. Note: \*In FY13 Expert System changed its accounting treatment of grants received from recognising them as operating grants to grants related to assets. We have adjusted FY11 and FY12, reclassifying all grants received in capitalised costs, to present revenue and capitalised costs on the same basis. Revenue is split by legal entity (Expert System SpA and Expert System USA Inc) that makes the sale rather than the target market.

### Long-term opportunity, not short-term forecasts, is key

We have based our forecasts on discussions with management, but the early stage of business development and immature market mean there is a wide margin of error in our estimates. Due to the difficulty of forecasting using a top-down approach in an immature market, we have built our forecasts using a bottom-up approach (ie using sales staff hires and sales targets to forecast revenue growth), but this does not take into account the macro conditions that will influence the success of the sales teams. Exhibit 6 shows our revenue forecasts for FY14 and FY15. We exclude ADmantX from our revenue assumptions as it is still a very early-stage company and it is uncertain at the moment whether it will be consolidated from FY14 onwards.

**Exhibit 6: Revenue breakdown for FY14e and FY15e (excluding ADmantX) (€)**

	2014e	2015e
<b>Net revenues</b>	<b>12,000,000</b>	<b>20,500,000</b>
Other income and grants	717,609	871,333
<b>Total income</b>	<b>12,717,609</b>	<b>21,371,333</b>

Source: Edison Investment Research

### Revenue assumptions

As mentioned above, there is a high degree of uncertainty over revenue forecasts due to the changing nature of the business and wide range of potential applications. Management does not disclose the breakdown of revenues by licence fee/project work/maintenance and support or other, but to develop a model with the correct revenue profile we have split our forecasts into these revenue streams. We believe it is important to do this because the proportion of sales across these categories has a significant impact on revenue growth profile and margin. Our assumptions for each of these streams are below:

- **Perpetual licence** – The average perpetual licence fee is assumed to be €35k in FY14 and FY15. It can vary significantly, however, depending on the product and the customer. We expect the revenue from licensing to increase as new products and cloud-based services are released.
- **Recurring licence** – The average recurring licence is assumed to be one-third of that of the perpetual licence. 22% of clients are assumed to sign up for a recurring licence. This is a very approximate estimate and therefore the sensitivity analysis provided in the valuation section should be considered when looking at these forecasts.
- **Professional fees** – We have assumed most revenue is currently from professional and consultancy fees. Size varies significantly. We have conservatively assumed moderate long-term growth in professional and consultancy fees as we expect most growth to come from licence fees and maintenance and support contracts.
- **Maintenance and support** – We assume maintenance and support revenue to be 15% of current year contract values plus 90% of previous year revenues (ie annual churn of 10%).
- **Other income and grants** – Grants are initially deferred and then recognised in revenue as the related assets (capitalised R&D) are depreciated. Management expects to receive €861k of grants (cash) in FY14 and €3.2m in FY15. The income from grants recognised in the P&L is expected to be €0.7m and €0.9m in FY14 and FY15 respectively.

### Exceptional 2012 due to significant US project and software resale

Revenues in 2012 were exceptional due to a significant project in the US that contributed c €1.4m to revenue and €800k of revenue that was due to resale of third-party software programs. Revenue growth between 2011 and 2013 was a relatively modest 2% per year, but this should accelerate following the post IPO investments in commercial and support staff in the US and new product development. The successful development of a platform to simplify the installation and set-up process for users means the product should become more scalable and therefore has the potential to significantly increase revenue growth.

### High effective tax charge should fall as revenue is generated outside Italy

The majority of the cost of the business is personnel (both permanent staff and consultants). We have assumed a 19% increase in personnel and operating costs in FY14 and a 46% increase in FY15 based on expansion of facilities and staff primarily in the US but also the UK. We forecast EBIT margin, as a result, to fall from 8% in FY13 to 4% in FY14 before returning to 9% in FY15e when growth accelerates. R&D is capitalised and amortised over three years and we assume 5% of revenue is spent on investment on R&D. Under Italian GAAP development costs are expensed in the R&D line in the P&L and the capitalised element is credited to revenue in the P&L. We make an

adjustment to reverse the credit out of revenues and instead offset it against R&D costs. Given the licensing business model, we think Expert System could reasonably achieve 20-30% EBIT margins in the long term as it reaches larger scale and more revenue is generated from high-margin licensing revenue. The effective domestic tax rate for Expert System is c 60% due to the national corporate tax rate of 31% and an additional regional tax, which is c 3.9% of revenues less costs excluding labour. This effectively adds another 30% to Expert System's tax rate. The effective tax rate will fall as more revenues come from the US.

## Balance sheet and cash flow

Expert System Spa had cash of €3.0m and debt of €8.1m at 31 December 2013. Most of the borrowings are bank debt (€2.7m due within 12 months and €4.5m due after 12 months) with the effective interest rate on that debt of c 2.97%. It raised €9.8m from the IPO in February, which will be used to fund international growth and further product development. Expert System USA and ADmantX had cash of €0.4m and €0.6m respectively at 31 December 2013 and no external debt. Expert System USA had debts due to Expert System Spa of €0.6m and ADmantX had debts due to its shareholders (including Expert System and minorities) of €0.8m. The current book value of the investment in ADmantX is €4.2m and the book value of Expert System USA is negligible, given that it is mainly funded by shareholder liabilities rather than equity. Expert System USA is expected to be consolidated from FY14 and therefore our forecasts include its earnings and cash flow. ADmantX, however, is excluded as there is still a high degree of uncertainty over its performance due to its early stage of development. The group (excluding ADmantX) is expected to be cash-flow positive in FY14. Further investment in ADmantX may be necessary but we have not forecast any additional investment. Expert System Spa generated €2.6m of free cash flow in FY12 and €0.6m in FY13 including grants. Grants are received from a variety of European and national organisations for development work on various projects.

## Valuation

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We have used a peer comparison and a DCF with scenario analysis to provide a basis for the valuation of Expert System. Given the wide variety of opportunities, early stage of the market and developing business model we believe scenario analysis is the most important tool in determining a valuation.

## Peer analysis

Exhibits 7 and 8 show the peer analysis. There is no directly comparable peer; the closest in terms of products is Nuance but it is more established and considerably larger, and generates a large proportion of revenues from its speech recognition software. Expert System is at a discount to Nuance on an FY15 EV/sales basis but a premium on an EV/EBITDA and P/E basis, which is to be expected given its significantly higher expected growth in FY15. The big data analytics companies could also be seen as peers but there is a wide range of valuations; Expert System is at a discount to the average on an FY15e EV/sales, EV/EBITDA and P/E basis.

**Exhibit 7: Peer comparison table – e-commerce search and big-data analytics companies**

	Current YE	Market cap (€m)	CY EV/S	NY EV/S	CY EV/ EBITDA	NY EV/ EBITDA	CY P/E	NY P/E	CY sales (€m)	CY EBIT margin	CY EBITDA margin	Sales growth NY	EPS growth NY
<b>Natural language understanding</b>													
Expert System	31/12/2014	41.5	3.0x	1.8x	17.2x	9.2x	N/A	40.8x	12.7	3.9%	17.3%	68%	N/A
Nuance	30/09/2014	3,450.5	3.1x	3.0x	10.0x	8.3x	13.8x	12.9x	1,448.0	22.4%	31.6%	5%	6.7%
<b>e-commerce search</b>													
SLI Systems Ltd	30/06/2015	69.1	2.6	2.1	N/A	N/A	N/A	N/A	22	N/A	N/A	34%	N/A
<b>eDiscovery</b>													
UBIC Inc	31/03/2015	173.3	4.2x	3.6x	20.3x	13.7x	31.1x	27.1x	40.0	N/A	20.7%	17%	14.7%
<b>Big data analytics</b>													
Splunk Inc	31/01/2015	5,076.6	14.0x	10.5x	361.1x	189.4x	2214.4x	432.9x	314.7	1.6%	3.9%	33%	N/A
Teradata Corp	31/12/2014	4,677.4	2.1x	2.0x	7.6x	7.0x	14.3x	13.1x	2,041.1	22.7%	28.1%	5%	9.1%
PRGX Global Inc	31/12/2014	115.3	0.7x	0.7x	5.4x	4.0x	246.5x	20.4x	123.9	N/A	12.4%	0%	1108.7%
PROS Holdings Inc	31/12/2014	521.1	3.5x	2.9x	26.0x	16.9x	77.1x	43.4x	141.0	N/A	13.3%	20%	77.9%
<b>Average</b>			<b>5.1x</b>	<b>4.0x</b>	<b>100.0x</b>	<b>54.3x</b>	<b>112.7x</b>	<b>127.4x</b>		<b>12.1%</b>	<b>14.4%</b>	<b>15%</b>	<b>398.6%</b>

Source: Bloomberg, Edison Investment Research. Note: Priced at 9 October 2014.

SaaS companies could also be suitable comparatives if Expert System's SaaS-based API business model is successful. For the enterprise search and information management peers, Expert System is at a discount on an FY15e EV/sales and EV/EBITDA basis, but a premium on a P/E basis due to its significant effective tax charge. This should normalise, however, as more revenues are generated outside Italy.

**Exhibit 8: Peer comparison table – enterprise search and SaaS companies**

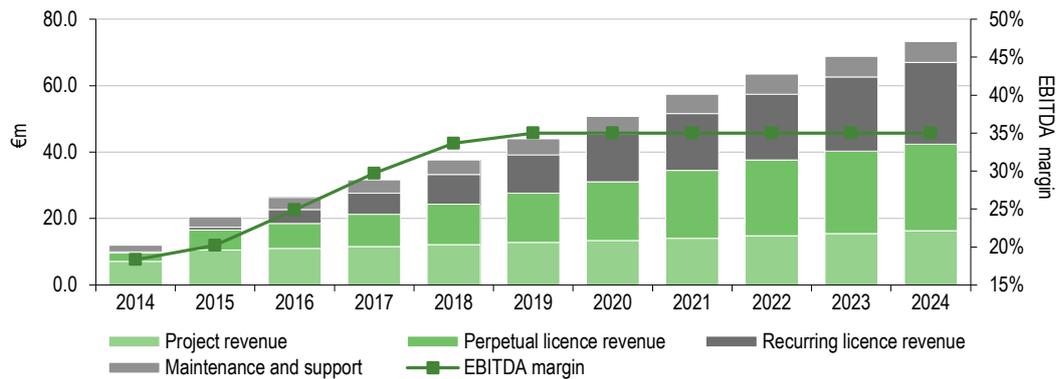
	Current YE	Market cap (€m)	CY EV/S	NY EV/S	CY EV/ EBITDA	NY EV/ EBITDA	CY P/E	NY P/E	CY sales (€m)	CY EBIT margin	CY EBITDA margin	Sales growth NY	EPS growth NY
<b>Enterprise search and information management</b>													
OpenText	30/06/2015	5,078.0	4.0x	3.8x	12.0x	11.2x	14.7x	13.5x	1,436.7	23.7%	33.4%	5%	8.7%
CommVault	31/03/2015	1,589.0	2.5x	2.2x	10.3x	8.5x	23.5x	20.3x	491.0	23.2%	24.4%	15%	16.0%
<b>Average</b>			<b>3.3x</b>	<b>3.0x</b>	<b>11.1x</b>	<b>9.9x</b>	<b>19.1x</b>	<b>16.9x</b>		<b>23.5%</b>	<b>28.9%</b>	<b>10%</b>	<b>12.3%</b>
<b>SaaS companies</b>													
salesforce.com	31/01/2015	26,189.2	6.7x	5.4x	37.0x	28.7x	112.2x	81.0x	3,946.1	10.5%	18.2%	24%	38.4%
NetSuite	31/12/2014	5,078.5	12.2x	9.5x	147.8x	113.3x	463.5x	253.9x	403.3	4.6%	8.3%	29%	82.6%
Concur Tech	30/09/2014	5,366.2	10.3x	8.3x	64.6x	50.1x	210.3x	138.7x	508.4	9.9%	15.9%	24%	51.6%
Ultimate Software	31/12/2014	2,763.6	7.3x	5.9x	31.0x	24.8x	66.1x	52.6x	372.3	20.1%	23.4%	23%	25.7%
Constant Contact	31/12/2014	652.9	2.3x	2.0x	12.7x	10.2x	27.3x	21.8x	243.3	10.8%	18.2%	15%	25.3%
Digital River	31/12/2014	389.7	0.6x	0.6x	4.9x	4.5x	36.4x	29.2x	278.4	4.9%	12.3%	7%	24.6%
<b>Average</b>			<b>6.6x</b>	<b>5.3x</b>	<b>49.7x</b>	<b>38.6x</b>	<b>152.6x</b>	<b>96.2x</b>		<b>10.1%</b>	<b>16.0%</b>	<b>20%</b>	<b>41.4%</b>

Source: Bloomberg, Edison Investment Research. Note: Priced at 9 October 2014.

## DCF: Multiple sensitivities and opportunities

Exhibit 9 illustrates our assumptions for the base-case DCF valuation. Gross margins for licensing, professional services and maintenance and support are assumed to be 80%, 30% and 50% respectively. Fixed costs are assumed to grow at 10% per year, but we have capped long-term EBITDA margins at 35% from 2018. As a comparison, in 2013, Nuance had product and licensing gross margins of 87%, professional services and hosting margins of 34% and maintenance and support margins of 80%. The EBITDA margin (excluding R&D and exceptional costs to be consistent with Expert System) for Nuance was 30% in FY13, down from 35% in FY12. Under these assumptions and assuming as a base a €70k average licence fee and 21% CAGR in client numbers, the DCF produces a valuation of €3.23 excluding any value from ADMantX.

**Exhibit 9: DCF assumptions**



Source: Edison Investment Research

## ADmantX

The investments and share transactions related to ADmantX since the IPO have been based on a valuation of €11m, which was calculated by an independent chartered accountant. Exhibit 10 shows the book value of ADmantX at the end of FY13 and the investments since then.

**Exhibit 10: Investments in ADmantX**

Date	Book value of investment (€)	ES % holding	Comment
31/12/2013	1,133,650	66	ES share of ADmantX book value of equity was €243,204. The independently assessed value of ADmantX was €11m, which implies at this time ES's share was worth €7.3m.
05/02/2014	3,653,074	89	ES conducted a share exchange (value of €2.5m) with Atlante Ventures Mezzogiorno for ADmantX shares based on the €11m valuation by an independent chartered accountant.
18/07/2014-1/08/2014	4,153,074	69	In a series of transactions ES invested €500,000 in ADmantX for 48,247 shares. Atlante Ventures Mezzogiorno converted €400k worth of bonds to equity and there was a €1.1m investment from a new investor. Following these transactions Expert System holds 69%, Atlante Ventures Mezzogiorno holds 21% and others hold 10%.

Source: Expert System accounts and press releases

We have constructed a simple two-stage DCF to attempt to verify this valuation. Using a WACC of 12%, terminal growth of 3%, 35% long-term EBITDA margins, 25% tax (as percentage of EBITDA), 6% capex, and 23% revenue CAGR to 2024, the DCF produces a valuation of €11m. Under these assumptions, revenue would be €6.8m and €11.7m in 2020 and 2024 respectively. These estimates could prove to be very conservative if ADmantX's technology is widely adopted. However, the adtech sector is very competitive and therefore there is also a risk that ADmantX could be worth significantly less than this. Assuming a €6.6m valuation for ADmantX (based on a relatively arbitrary 40% discount to €11m valuation) and a 70% shareholding by Expert System, our DCF produces a valuation of €3.44/share for the group.

## Development of platforms key to accelerating growth

Our forecasts assume that the development of the tools that allow user integration and set-up of the Cogito platform accelerate the sign up of clients without the need for Cogito engineers. We assume professional service fees grow relatively modestly at 5% a year. There is still a high degree of uncertainty on the success of the cloud-based and platform based products. One of the key competitive advantages of Expert System's technology is its perceived quality, and part of this is likely to be due to the quality of the engineers developing and setting up the custom solution for their customers. It remains to be seen whether the technology will be as effective when the process becomes more automated and there is less input from engineers in the set-up.

## Sensitivity analysis

Revenue and valuation are sensitive to a number of inputs and assumptions. The key assumptions are average (perpetual and recurring) licence fee and customer growth rate. Exhibit 11 shows the

range of calculated share prices for the range of perpetual licence fees and CAGR in client numbers. Exhibit 12 shows the terminal revenue that is achieved given these same assumptions. Exhibit 13 shows the sensitivity to the long-term EBITDA margin.

<b>Exhibit 11: Valuation sensitivity analysis (€) – licence fee vs CAGR in client numbers</b>							
		Client number CAGR to 2024					
		1%	6%	11%	16%	21%	26%
Average perpetual licence fee (€)	50,000	1.45	1.68	1.99	2.40	2.76	3.20
	60,000	1.54	1.82	2.20	2.60	3.00	3.51
	70,000	1.64	1.96	2.39	2.78	3.23	3.81
	80,000	1.73	2.10	2.54	2.95	3.45	4.10
	90,000	1.83	2.24	2.67	3.10	3.66	4.39

Source: Edison Investment Research. NB: Data within table is share price (€).

<b>Exhibit 12: Terminal revenue (€m) (2024)</b>							
		Client number CAGR to 2024					
		1%	6%	11%	16%	21%	26%
Average perpetual licence fee (€)	50,000	52.4	55.7	60.5	67.2	76.3	88.7
	60,000	53.5	57.6	63.3	71.3	82.3	97.1
	70,000	54.7	59.4	66.1	75.4	88.3	105.5
	80,000	55.9	61.2	68.9	79.6	94.2	114.0
	90,000	57.0	63.1	71.7	83.7	100.2	122.4

Source: Edison Investment Research. NB: Data within table is 2024e revenue (€m).

<b>Exhibit 13: Valuation sensitivity analysis – terminal EBITDA margin</b>								
		Terminal EBITDA margin						
		20%	25%	30%	35%	40%	45%	50%
DCF valuation (€/share)		0.62	1.50	2.38	3.23	4.04	4.78	5.31

Source: Edison Investment Research

## Tech giants acquire semantic and AI technology

Over the last few years there has been growing interest in semantics and AI generally, with an increasing amount of high-profile M&A activity in the space. Google acquired DeepMind in January 2014 for an undisclosed sum (reported to be c £400m<sup>1</sup>). Yahoo! acquired SkyPhrase in December 2013. Prior to the acquisition SkyPhrase was focused on applying its NLP technology to a growing number of verticals and providing it to third-party providers to incorporate into their own applications, similar to Expert System. Yahoo! has also shown interest in very young start-ups such as Summly, which was acquired for \$30m in March 2013. Facebook has expanded its artificial intelligence laboratory and Apple acquired Siri in 2010. Interestingly Walmart has also acquired a semantic advertising company called Adchemy in May 2014. Lexalytics, one of Expert System's closest peers, acquired Semantria in July 2014, for an amount reported<sup>2</sup> to be less than \$10m, and recently Microsoft has signed a letter of intent to buy Israeli text analysis (machine learning based) start-up Equivio, which has been reported<sup>3</sup> to be worth around \$200m.

<sup>1</sup> [www.bbc.co.uk/news/technology-25908379](http://www.bbc.co.uk/news/technology-25908379)

<sup>2</sup> <http://venturebeat.com/2014/07/15/lexalytics-buys-semantria-because-ya-gotta-be-able-to-analyze-text-in-the-cloud/>

<sup>3</sup> <http://online.wsj.com/articles/microsoft-to-buy-text-analysis-company-equivio-1412700084>

**Exhibit 14: Financial summary**

	€000s	2012	2013	2014e	2015e
Year end 31 December		IT GAAP	IT GAAP	IT GAAP	IT GAAP
<b>PROFIT &amp; LOSS</b>					
Revenue		11,593	11,109	12,718	21,371
EBITDA		2,655	2,014	2,200	4,144
Operating Profit (before amort. and except.)		1,765	916	500	2,000
Intangible Amortisation		0	0	0	0
Exceptionals		(319)	45	0	0
Other		0	0	0	0
Operating Profit		1,446	961	500	2,000
Net Interest		(298)	(376)	(367)	(367)
Profit Before Tax (norm)		1,467	539	133	1,633
Profit Before Tax (reported)		1,148	584	133	1,633
Tax		(452)	(359)	(360)	(615)
Profit After Tax (norm)		1,015	180	(227)	1,018
Profit After Tax (reported)		697	225	(227)	1,018
Average Number of Shares Outstanding (m)		22.0	22.0	22.0	22.0
EPS – normalised (c)		4.6	0.8	(1.0)	4.6
EPS – normalised and fully diluted (c)		4.6	0.8	(1.0)	4.6
EPS – (IFRS) (c)		3.2	1.0	(1.0)	4.6
Dividend per share (c)		0.0	0.0	0.0	0.0
EBITDA Margin (%)		22.9	18.1	17.3	19.4
Adj Operating Margin (%)		15.2	8.2	3.9	9.4
<b>BALANCE SHEET</b>					
Fixed Assets		6,691	9,905	13,673	13,929
Intangible Assets		1,111	2,462	3,725	3,981
Tangible Assets		635	606	606	606
Investments		4,945	6,836	9,342	9,342
Current Assets		12,767	15,491	24,151	24,685
Stocks		722	476	476	476
Debtors		5,488	5,820	6,584	11,247
Cash		2,065	2,967	11,725	10,781
Other		4,492	6,228	5,367	2,181
Current Liabilities		(8,871)	(10,333)	(10,522)	(11,165)
Creditors		(6,538)	(7,350)	(7,538)	(8,182)
Short term borrowings		(2,332)	(2,984)	(2,984)	(2,984)
Long Term Liabilities		(4,642)	(5,172)	(5,172)	(5,172)
Long term borrowings		(4,642)	(5,172)	(5,172)	(5,172)
Other long term liabilities		0	0	0	0
Net Assets		5,945	9,890	22,129	22,276
<b>CASH FLOW</b>					
Operating Cash Flow		1,899	2,979	1,768	2,438
Net Interest		(298)	(376)	(367)	(367)
Tax		(452)	(359)	(360)	(615)
Capex		(3,095)	(2,384)	(2,963)	(2,400)
Acquisitions and Investment in subs/disposals		0	0	(2,505)	0
Financing		0	0	13,184	0
Dividends		0	(180)	0	0
Net Cash Flow		(1,946)	(320)	8,757	(943)
Opening net debt/(cash)		6,352	4,909	5,189	(3,568)
HP finance leases initiated		0	0	0	0
Other		3,389	40	0	0
Closing net debt/(cash)		4,909	5,189	(3,568)	(2,625)

Source: Expert System's accounts, Edison Investment Research. Note: FY12 and FY13 exclude Expert System USA and ADmantX subsidiaries. FY14e and FY15e include Expert System USA but exclude ADmantX. Balance sheet and cash flow are unconsolidated.

Contact details	Revenue by geography
Via Virgilio Staircase 5 41123 Modena Italy +39 059 894011 www.expertsystem.net/	N/A

CAGR metrics	Profitability metrics	Balance sheet metrics	Sensitivities evaluation
EPS 11-15e	N/A ROCE 14e	N/A Gearing 14e	N/A Litigation/regulatory
EPS 13-15e	137.7% Avg ROCE 11-15e	N/A Interest cover 14e	1.4x Pensions
EBITDA 11-15e	N/A ROE 14e	N/A CA/CL 14e	2.3 Currency
EBITDA 13-15e	43.4% Gross margin 14e	N/A Stock days 14e	13.7 Stock overhang
Sales 11-15e	N/A Operating margin 14e	3.9% Debtor days 14e	189.0 Interest rates
Sales 13-15e	38.7% Gr mgn / Op mgn 14e	N/A Creditor days 14e	37.1 Oil/commodity prices

Management team
<b>Founder and CEO: Stefano Spaggiari</b> Stefano holds an EMBA from Alma Graduate School of the University of Bologna and a degree in computer science from the University of Modena, Italy. Stefano is involved in raising the profile of semantic technology throughout Italy.
<b>Founder and CTO: Marco Varone</b> Marco created the Cogito technology and leads the company's technological development in the areas of linguistics and technology management. He holds a degree in computer science from the University of Modena, Italy.

<b>VP Strategy and Business Development: Luca Scagliarini</b> Luca is responsible for leading Expert System's worldwide sales. In 2010 he helped found and launch ADmantX, where he previously served as CEO. Luca holds an engineering degree from the Politecnico di Milano, Italy, and an MBA from Santa Clara University, California.	<b>COO Intelligence Division: Andrea Melegari</b> Andrea leads sales, support and solutions for the Intelligence and Security segment. He holds a degree in computer science from the University of Modena, Italy, and prior to Expert System founded ExpertWeb.
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<b>EVP Corporate development: Luigi Paraboschi</b> Luigi joined Expert System as CFO from HP in the US where he was vice president of finance for various divisions. He has a degree in economics from Bocconi University in Milan, Italy. In March 2014 he moved to the US to develop the international business as EVP corporate development.	<b>EVP (North America business development and sales): Bryan Bell</b> Bryan has previously worked in organisations that develop desktop training, search, automated metadata extraction, taxonomy creation, knowledge management and semantic technologies. He was director of sales (central US) at Autonomy and helped build Teach.com, smartlogic and Concept Searching.
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<b>Founder and R&amp;D Director: Paolo Lombardi</b> Paolo helped developed the Cogito technology platform and now leads the development of new semantic technology products. He holds a degree in computer science from the University of Modena, Italy.	<b>VP, Enterprise Division: Marcello Pellacani</b> Marcello focuses on social media monitoring and sentiment analysis technologies. Prior to Expert System he was president and CTO of ExpertWeb, which was bought by Banzai group.
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Principal shareholders	(%)
Marco Varone	12.5
Paolo Lombardi	12.5
Stefano Spaggiari	12.5
Carlo Gualandri	6.1

Companies named in this report
Google, Nuance, Walmart, SLI Systems, UBIC Inc, Splunk Inc, Teradata Corp, PRGX Global Inc, PROS Holdings Inc, Vodafone, Raytheon, 3M, ING Direct, Chevron, Eni, Shell, UniCredit, Microsoft

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