EXPERT SYSTEM

Robotics is wonderful !

January 17th, 2019

BUY

Price target: **€1.78**

Potential return: **+43%**

Expert System (ES) offers a unique opportunity to benefit from the megatrend in the very attractive growth of the Artificial Intelligence (AI) market. The Group is postioned to take advantage of the strong and sustained growth in demand, particularly thanks to its rare and differentiating cognitive analysis technology based on AI algorithms.

AI market presenting an upward megatrend

In our opinion, ES represents a relevant investment angle to capture the strong growth in the AI market presenting an upward megatrend globally (+47.6% 2017A-21E CAGR to reach $57bn in 2021E), more specifically, in the global market for text analytics (part of AI) that should reach $8.79bn by 2022 (+17.2% 2017A-22E CAGR), driven by an increasing adoption rate and the progressive democratisation of the technology, thus reinforcing the legitimacy of ES on its market.

ES, a pure player with a rare expertise

ES is an independent leader in cognitive analysis technology for the management of unstructured content, characterized by a strong growth profile (x2.2 2014A-17A Sales, *i.e.* +29.7% CAGR). The group's distinctive technology is highly protected, developed in-house, with no open source code, and is patented internationally (also in the USA). This strong expertise is recognised and validated by the market (i) on an international level (exports represented 63% of 2017 revenue vs 17% only in 2013), (ii) through contracts and tenders notably won from major industrial firms and governments, and (iii) by the fact that the group is recognized by some renowned market specialists such as Forrester, Gartner, Google, etc.

On the threshold of significant margins improvement

ES' EBITDA margin is expected to soar significantly following the improvements expected in the Group's historically low margins, increasing to 25.1% by 2021E, bolstered by (i) the modular effect of the company's business model with a majority share of fixed and semi-fixed costs (representing around 79% of total operating costs in 2017), (ii) the streamlining of the product offering from perpetual to yearly licensing, (iii) the streamlining of the commercial strategy with the roll-out of up-selling and cross-selling strategies, (iv) the integration of the French and German subsidiaries.

An attractive valuation

The strong business momentum and the levers to improve profitability are likely to continue over the coming years in a favourable market context. Posting almost similar EBITDA margins to peer group, ES currently trades at 6.6x and 5.2x EV/EBITDA 2019E and 2020E respectively, compared to 23.3x and 16.0x for the peer group respectively, calling for revaluation of the share. Consequently, we initiate the coverage of ES with a buy recommendation and a price target of €1.78 per share.

Market Information

Industry	Artificial Intelligence
Share price (€)	1.25
Market cap. (€m)	44.6
Market segment	FTSE AIM Italia
Bloomberg	EXSY IM

Ownership structure

Management	27.0%
Free Float	73.0%

€m (31/12)	2017	2018e	2019e	2020e
Sales	26.1	29.1	33.2	37.9
Δ%	*11.8%*	*11.5%*	*14.0%*	*14.0%*
EBITDA	1.0	4.1	7.4	9.4
Margin (%)	*4.0%*	*14.0%*	*22.1%*	*25.0%*
Net income	(8.3)	(4.3)	(2.2)	0.9
EPS (€)	(0.23)	(0.12)	(0.06)	0.02
Δ%	0.0%	n.m.	n.m.	n.m.
Dividend (€)	0.00	0.00	0.00	0.00
Dividend Yield	*0.0%*	*0.0%*	*0.0%*	*0.0%*
FCF	(8.4)	(2.2)	0.5	1.8
RoCE	(20.9%)	(12.5%)	(1.8%)	9.1%
EV/Sales (x)		1.7x	1.5x	1.3x
EV/EBITDA (x)		11.9x	6.6x	5.2x
P/E (x)		n.s.	n.s.	52.4x
Net debt	8.8	11.7	12.9	12.8
Net Gearing	46%	78%	101%	93%

Midcap Partners' estimates

Next event

FY2018 earnings	Undisclosed

Recommendations History

17/01/2019	BUY

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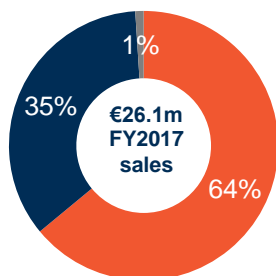
I. Presentation of Expert System

Description

Founded in Modena (Italy) in 1989 and listed on the Milan stock market in 2014, Expert System is a software publisher based in Europe and USA, that develops and markets cognitive analysis software based on artificial intelligence algorithms capable of reading and understanding the content of text documents in 14 different languages.

Expert System has 150+ active customers in the following sectors: Bank and Insurance, Public Administrations, Defence and intelligence, Life Sciences and pharmaceutical industry, O&G, Media and Publishing.

Expert System is an international group with a network of 230 employees in 6 countries.

Shareholder structure

- Management 27%
- Free float 73%

Breakdown of 2017 Revenue by segment

€26.1m FY2017 sales

- Licence (incl. maintenance) 64%
- Professional Services 35%
- Other 1%
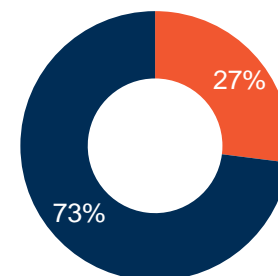
Breakdown of 2017 Revenue by geographical area

€26.1m FY2017 sales

- Italy 37%
- Europe 35%
- USA 28%
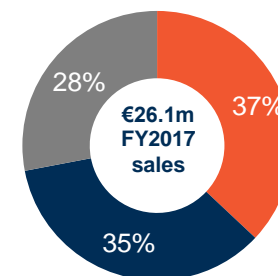
Presentation of Expert System (cont'd)

Change in the business

Revenues (€m): 12.0 (2014), 16.4 (2015), 23.4 (2016), 26.1 (2017), 12.9 (1H2018)
EBITDA (€m): 2.3 (2014), 1.2 (2015), (2.2) (2016), 1.0 (2017), 0.1 (1H2018)
margin (%): 19.5%, 7.3%, -9.4%, 3.8%, 0.6%

Legend:
- Revenues (€m)
- EBITDA (€m)
- margin (%)

Group's geographical presence

Americas

Europe

- Global presence
- Corporate Offices
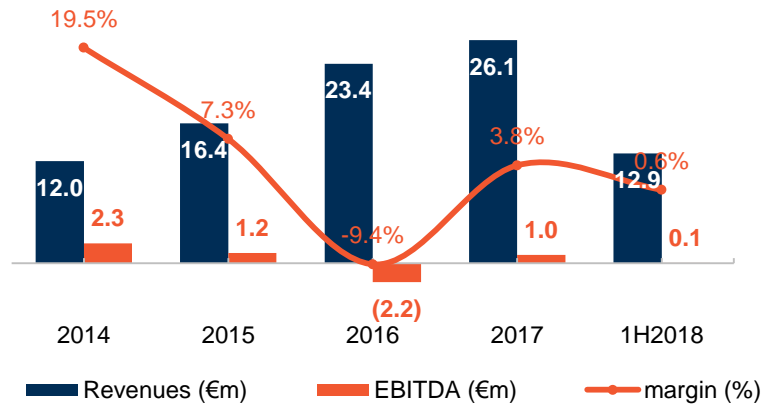
SWOT analysis

Strengths

- Independent leader in cognitive semantic artificial intelligence, validation by the market (company mentioned in the most prestigious sector reviews, such as Gartner & Forrester)
- Strong know-how and ability to implement customised solutions
- Protected and patented technologies, including in the USA
- Around 50% of revenue is recurrent thanks to certain licences and maintenance
- Migration towards a distribution model of annual licences vs perpetual previously
- Diversified customer base, top 10 customers represent 40% of 2017 revenue

Weaknesses

- Low margins but expected to significantly improve
- Significant investments in R&D and business
- Low cash conversion despite significant increase in revenue
- Limited business visibility (around 6 months of backlog)

Opportunities

- Strong growth in targetable market
- Strong exercise of pricing power
- Continue x-sell and up-sell strategies
- Centralise R&D in a country offering significant tax savings
- Consolidate the Group's presence in FR & GER thanks to M&A operations
- Speculative aspect of the dossier: thanks to its unique know-how, ES may interest tech giants

Threats

- Risk of dilution following a potential capital increase
- Competition from tech giants, even though ES's offering is not part of their core business

II. Expert System, a project likely to become a leader in the cognitive artificial intelligence sector

A. Artificial intelligence, a market with an upwards mega trend

Artificial intelligence (AI) has attracted growing interest over the last few years. However, the market is still in a start-up phase, so has substantial growth potential for its players.

We distinguish 3 categories of AI (Machine Learning, Robotics and Artificial Neural Networks), which comprise the AI eco-system as illustrated in the chart below.

Exhibit 1: AI eco-system
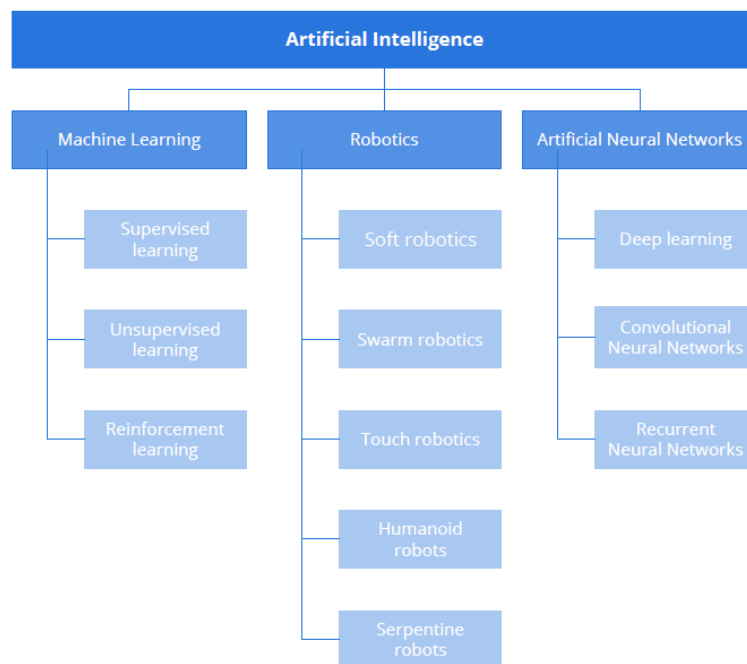
Source: McKinsey

Machine learning or statistical learning is an area of AI study based on statistical approaches to provide computers with the ability to learn from data, i.e. improve their problem solving performance without explicitly being programmed for each one. More broadly, it includes the design, analysis, development and implementation of these methods.

Machine learning generally includes two phases. The first consists of estimating a model from data, known as observations, which are available and in finite number, during the system's design phase. The model estimate stage consists of solving a practical task, such as translating a speech, estimating a probability density, recognising the presence of a cat in a photo or taking part in driving an autonomous vehicle. This so-called learning or training phase is generally carried out prior to the model's practical use. The second phase corresponds to production: as the model has been determined, new data can be submitted to obtain the result corresponding to the desired task. In practice, some systems can continue to learn once they are in production, as long as they have a way of obtaining feedback on the quality of the produced results.

Exhibit 2: Illustration of the Machine Learning process
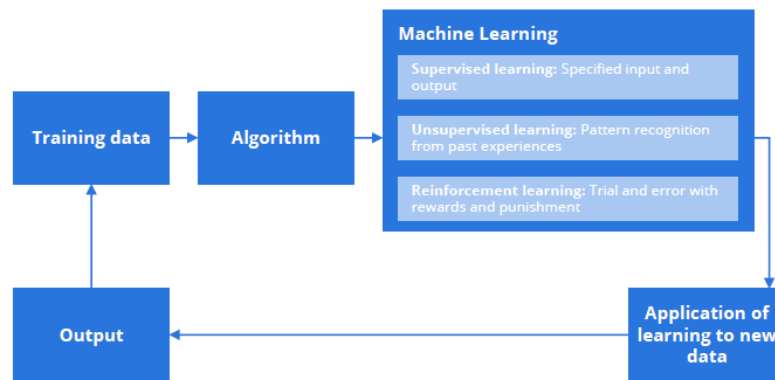
Robotic AI (including ES) involves the production and training of robots so that they interact with humans and the environment in a general, predictable way.

Expert System is included in this category, and more specifically in the Robotic Process Automatization (RPA) and develops and markets cognitive analysis software based on artificial intelligence algorithms capable of reading and understanding the content of text documents in 14 different languages.

For example, applied to the banking & insurance sector, ES enables (i) the automation of the customer service (Chatbots, natural language Q&A, automatic categorisation of email and intelligent search applications), (ii) the enhancement of AI robotic process automation (loan approvals, claims management, policy underwriting, audit support, etc.), (iii) the mitigation of operational risks (third-party risk management, fight against money laundering and legal compliance procedures, cybersecurity intelligence), (iv) the enrichment of customer analytics (analyse and predict consumer behaviour and trends in real time to support audience targeting), and (v) the optimisation of knowledge management and strategic monitoring (support corporate intelligence, investment strategies and competitive analysis activities). A case study for ING is mentioned below.

Exhibit 3: Case study: ING

| Customer	ING Direct
Solution implemented	■ Expert System developed an advanced semantic search engine for ING DIRECT, optimizing search and information retrieval on its customer portal at www.ingdirect.it. The search portal helps customers quickly find the content they need, **resulting in a 46% reduction in call center requests**. ■ The advanced semantic engine developed for ING DIRECT is a **combination of two powerful semantic products: Cogito Smart Search for semantic search and analysis, and Cogito Answers for natural language processing.** Together, they bring a complete semantic and linguistic understanding to customer queries, taking into account variations in language such as slang or abbreviations, and result in the effective and immediate retrieval of answers to online requests.
Benefits for the customer	■ Simplified search on the portal www.ingdirect.it and improved user experience ■ Strengthened online customer service while reducing traditional assistance. ■ Increased use of the search portal has led to a 46% reduction in call center requests.
Review received from the customer	*"ING Direct is always looking for innovative and interactive services that extend the range of our offer and ensure more accurate customer support. Expert System's semantic technology has allowed us to implement a system that improves identification of customer needs, allowing us to satisfy them quickly and effectively while improving our call center performance".*

Artificial Neural Networks form a system whose conception was originally systematically inspired by the functioning of biological neurones, and which has gone on to become closer to statistical methods.

Neural networks are generally optimised by probability-based learning methods. They are placed on the one hand in the family of statistical applications, which they enrich with a set of paradigms that create fast classifications. On the other hand in the family of AI methods to which they provide an independent perception mechanism and provide entry data for formal logical thinking (Deep Learning).

AI technologies comprise Expert System's offering, with analysis of texts and the cognitive system being particularly buoyant.

According to the latest IDC forecasts, global investments in cognitive systems and AI will be higher than expected: by 2021 they should represent $57Bn (+47.6% CAGR 2017-2021e). In 2017, expenditure on these technologies reached $12.0Bn (+59.1% YoY).

Exhibit 4: Change in global investments in cognitive systems (in $bn)
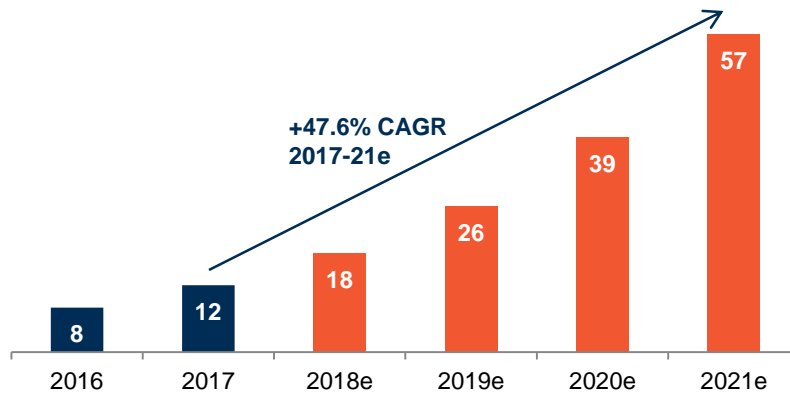
Source: IDC

The emergence of AI should better serve our economy by enabling the implementation of significant productivity gains. The solutions and services offered by AI should notably address the decline in the active population, reduce workforce costs, increase yields and the reliability of production, support and accelerate global productivity.

The potential for automation is considerable. According to McKinsey, the industries likely to benefit the most will be the manufacturing, financial, media, healthcare and education sectors.

Exhibit 5: Potential for the optimisation of processes by industry
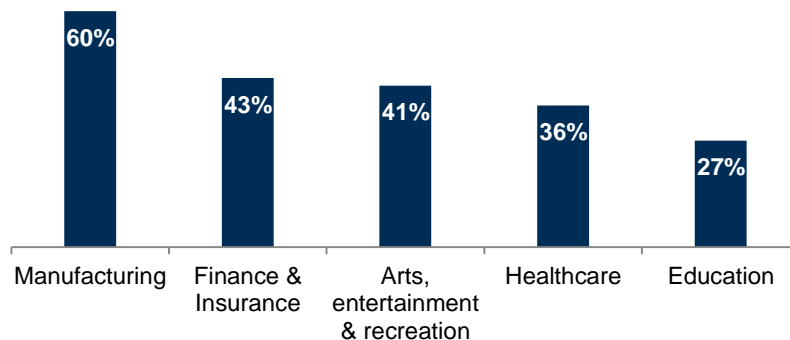
Source: McKinsey

In terms of AI adoption, a significant market remains to be captured and should be more receptive over the coming years, as only around 22% of companies reject the adoption of AI.

Exhibit 6: Adoption of AI by companies
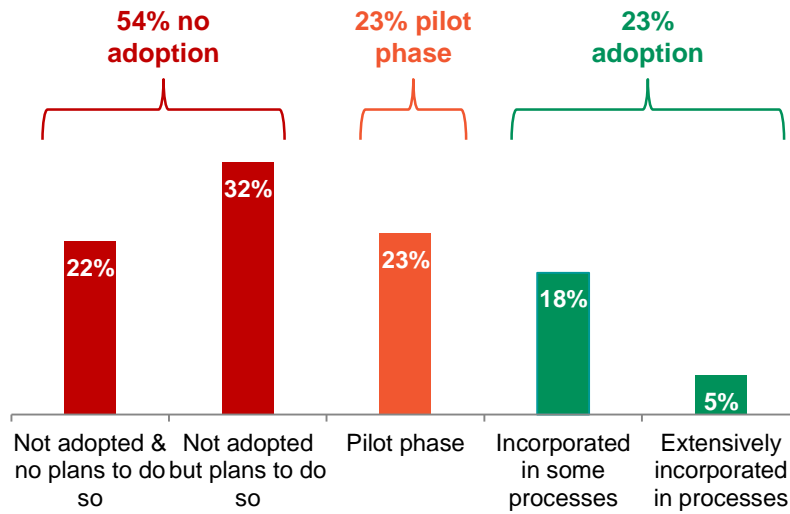
Source: BCG & MITSloan

The main reasons that push organisations to adopt AI are to obtain competitive advantages, develop new business and thwart competitors, as illustrated in the following chart.

Exhibit 7: Reasons for the adoption of AI by organisations
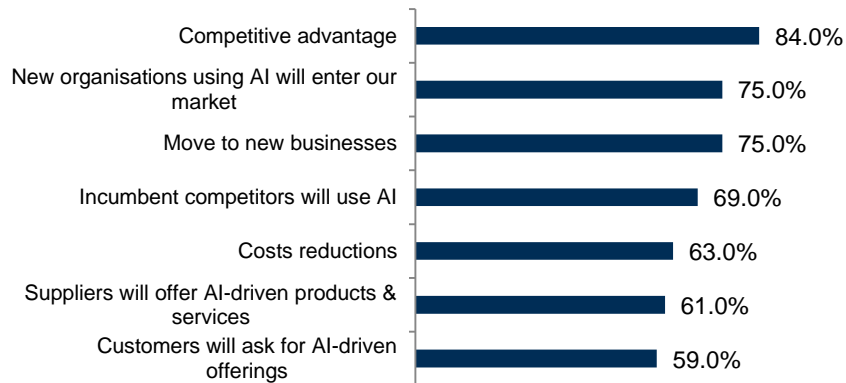
Source: BCG & MITSloan

The global market for text analytics (part of AI) should reach $8.79Bn by 2022 (+17.2% 2017-22 CAGR), driven by an increasing adoption rate and the progressive democratisation of the technology.

Exhibit 8: The global market for text analytics should reach $8.79Bn by 2022

+17.2% CAGR 2017-22e

- 2014: 1.70
- 2017: 3.97
- 2022: 8.79
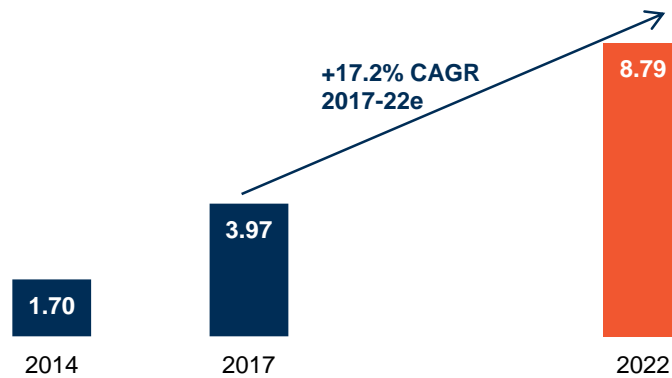
Source: World Text Analytics Market

B. A proven know-how allowing Expert System to offer a full range of products and services

Expert System offers comprehensive cognitive and text analysis services and supplies a growing number of applications, in 14 languages, to several of the largest and most prestigious companies and administrations in Europe, USA and the Middle East.

ES has a strong growth profile. In only 2 years (between 2014 and 2016), the Group (i) was listed on the stock market, (ii) opened new offices in the USA and UK, (iii) completed 2 acquisitions and (iv) launched new cognitive solutions. ES's know-how has also been validated by the two top market specialists, Forrester and Gartner.

Exhibit 9: Rapid and sustained development
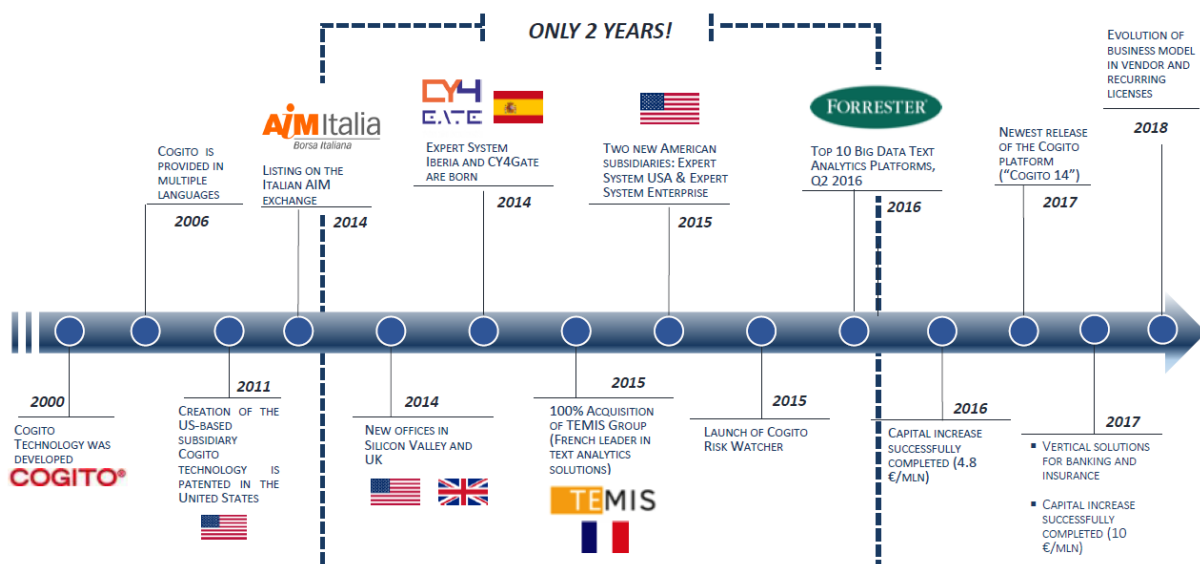
Source: Company

The recent growth testifies to the Group's constant desire to develop and offer new, increasingly sophisticated functionalities to companies and administrations, and also to offer a high level of customer service and extend its presence and infrastructures worldwide. Expert System develops technologies that transform the way in which information is found, understood and used. Its main mission is to develop software that understands written language in the same way as humans, with the required speed and precision, in order to identify, manage and exploit large volumes of strategic information.

As a company specialising in cognitive information technology and text analytics, Expert System knows that there are a number of ways of analysing texts. So-called traditional technologies treat texts as keywords, analysing the frequency of words requiring us to manage word lists to feed a system of correspondences: i.e. a lot of constraints, and notably that of constantly managing the system.

R&D

Current investments in **R&D activities are a key factor in Expert System's strategy, as it needs to remain at the cutting-edge in cognitive technologies applied to unstructured data in order to meet the growing sophistication of customer demand and retain a competitive advantage.** The costs for these activities are capitalised and amortisable over 5 years, also as part of certain national and international multi-year research projects. **During research projects, the contract stakeholders participate in Expert System's R&D financing for an overall amount of between around €1M-€1.5M p.a.** These activities involved the Cogito semantic platform and the associated products to manage the common use cases of the customers. For development tools used to customise projects, the most significant efforts have been focusing on including and perfecting deep learning approaches and improving knowledge graph management (Sensigrafo) and component integration.

The Group has solid R&D skills, with the announcement in 2016 of the creation of 2 new R&D laboratories in the USA, one close to Washington, and the other in the Silicon Valley.

The development of the Cogito Laboratories is part of Expert System's strategy to ensure effective cooperation between its engineers and developers and the best expert networks comprising linguistics professionals, universities, researchers and specialists.

The new USA-based laboratories – that reinforce the network of Cogito Labs already located in Modena, Rovereto and Naples (Italy), Grenoble (France), and Madrid (Spain) – have the task of developing innovative approaches and technologies based on the Cogito technology.

It is also important to underline that the R&D activities benefit from small tax credits in Italy. It could be relevant for the Group to locate these activities in France in order to benefit from a more favourable tax structure.

Exhibit 10: Change in R&D investments (€m)
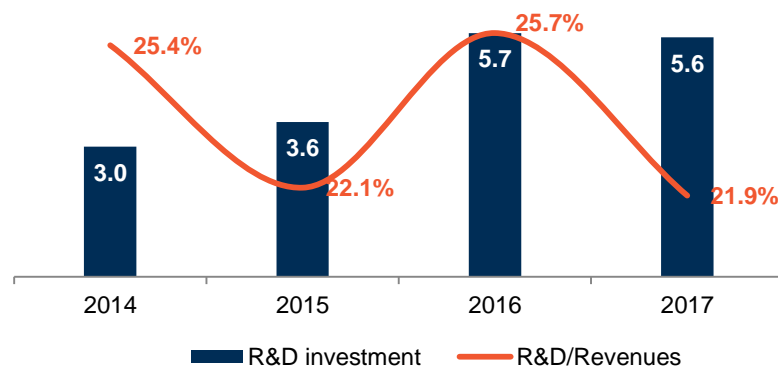
Source: Expert System

As most of the R&D investments in terms of technology have been achieved, we expect R&D of around €6M in 2018e and 2019e, in line with 2016 and 2017.

A patented technology

Expert System protects its Cogito cognitive technology, which has also been patented in the USA since 2011. This protection provides significant security for the Group against the risk of plagarism that is omnipresent in the technology market. Unlike most of its competitors, the code (i) does not contain open source software, (ii) was developed in-house and (iii) belongs wholly to Expert System.

A full range of products and services

Cogito, the software developed by Expert System, is different from traditional existing technologies that process texts as character chains (key words) or using statistic-based approaches or pure machine learning.

Traditional technologies do not understand the meaning of the words. Cogito, on the other hand, offers a range of products that help organisations to create value within their knowledge and customer experience management, their risk reduction strategies and through the development of powerful intelligence. At the heart of each Cogito product is a full range of cognitive functionalities that enable the knowledge present in the large volumes of unstructured information managed by the Group's customers to be exploited, for strategic comprehension, better decisions, process automation based on large volumes of information, and also a reduction in operational risks.

Launch of version 14 of Cogito

In 2017, Expert System continued its growth strategy based on product innovation by launching version 14 of its Cogito platform which aims to simplify process automation and the development of advanced information intelligence applications.

The result of an effective synergy between the "Cogito Labs" teams (USA, Italy, France and Spain) and the new talents that recently joined the Group (like former TEMIS), this new version offers both new languages and several high added value functionalities, including:

- **Cogito Studio** is a complete development environment that enables users to directly customise Cogito's core capabilities. Cogito Studio makes developing projects more intuitive and enables them to be implemented faster. It also now includes the Cogito Studio Express module, an intuitive web application that gives the final user the option of designing and maintaining his/her own taxonomy/ontology and of administering his/her semantic analysis process;
- **Cogito Knowledge Graph** centralises several million concepts, their lexical form, characteristics and relationships, and can precisely disambiguate the meaning of the words and expressions contained in the documents. Enriched with new areas such as finance and biopharma in this version 14, Cogito Knowledge Graph leverages proprietary machine learning algorithms to enrich its business knowledge automatically from the texts with or without supervision from subject-matter experts;
- **Cogito API:** Cogito benefits from an enriched version of its native API that simplifies the development and integration of applications designed based on Cogito with other existing platforms or architectures. In this way, deployments are simplified and accelerated.

The chart below presents Expert System's products.

Exhibit 11: Expert System products

Cogito Discover	Discover is a knowledge management software solution that builds on its understanding of language to classify, extract and make available information included in text content.
Cogito Intelligence Platform	Cogito Intelligence Platform reveals hidden knowledge and intelligence, whatever the volume of unstructured content it is faced with, to help analysts at each stage of their monitoring activities, within administrations and all other sectors.
Cogito Answers	Cogito Answers is Expert System's semantic software solution that allows comprehensive semantic and linguistic understanding of content and requests, in order to transform the customer experience.

Cogito for Claims	Cogito for Claims, Expert System's software solution for the insurance sector, which automates the claims management process by detecting and extracting the essential data, thus reducing the time and cost of claim processing.
Cogito for Underwriting	Cogito for Underwriting is Expert System's software solution for the insurance sector, which automates the management of underwriting, analyses and compares insurance policies to avoid inconsistencies and automates the assessment of real estate risk evaluation reports.
Cogito Studio	Cogito Studio is a fully integrated environment for the creation and deployment of customised semantic applications.
Biopharma Navigator	Biopharma Navigator for medical research explores the biopharmaceuticals and health data environment via an intuitive analysis display interface, enabling the user to find the answers to his/her questions in a few clicks.
API and Integrations	Cogito API is a suite of semantic functionalities and tools, available for developers via a perfectly documented API REST interface.

Source: Company

Illustration of the benefits of using Cogito in the different business sectors

The charts below present Cogito's technology in more detail (also available in appendix 1).

Exhibit 12: Benefits of using Cogito by business sector

Bank & Insurance	■ **Automate customer service:** Chatbots, natural language Q&A, automatic categorisation of email and intelligent search applications ■ **Enhance AI robotic process automation:** Loan approvals, claims management, policy underwriting, audit support, etc. ■ **Mitigate operational risk:** third-party risk management, fight against money laundering and legal compliance procedures, cybersecurity intelligence ■ **Enrich customer analytics:** analysis and prediction of customer behaviour and trends in real time to support audience targeting ■ **Optimise knowledge management and strategic monitoring:** supports corporate intelligence, investment strategies and competitive analysis activities
Governmental agencies	Cogito provides concrete support for both tactical and strategic Defense & Intelligence activities: ■ **Information analysis and monitoring:** crime prevention support for law enforcement ■ **Proactively supports analysts** in OSINT, GEOSINT and other intelligence activities Cogito helps government organisations find the right information at the right time and better serve citizens through natural language user interfaces, chatbots and mobile services.
Publishing & Media	■ **Increases productivity** in editorial content creation and enhances the value of content with automation ■ **Boosts monetisation opportunities and generates new** revenue with recommendation engines, contextual advertising, etc ■ **Supports investigative journalism** with intuitive research and content analysis functionalities
Scientific & Pharmaceuticals	■ **Top-level research strategy support** through analysis of industry trends and patient feedback ■ **Simplifies access to scientific knowledge** and the published work of leading industry experts ■ **Monitors competitor product development** ■ **Optimises information management** and knowledge sharing
Oil & Gas	■ **Improves the management of information** and knowledge at all key stages in the energy process (Exploration, Production, Trade and Marketing, Asset Protection, etc.) ■ **Strengthens trade and investment activities** thanks to real time access to strategic information ■ **Leverages information to reduce operational risks**

Source: Company

The solutions offered by Expert System considerably reinforce the Group's customers' ability to exploit the knowledge that they have available, to improve their decision making, strategic planning and market understanding, by allowing them to automate the processes based on large volumes of information, build deep relationships with their customers and mitigate risks for their businesses.

Expert System's cognitive information and text analysis applications provide multiple answers to business needs (semantic research, categorisation and creation of automatic metadata, multilingual

text analysis tools, processing of natural language and development and management of taxonomies and ontologies).

All Expert System's text mining solutions are presented in the chart below.

Exhibit 13: Expert System's text mining solutions

Knowledge management	Transforms business data into precious information and optimises its availability and accessibility. Unstructured data can constitute a significant asset for all the company's systems and assets, thanks to Cogito's knowledge management solutions.
Robotic Process Automation (RPA)	Smart RPA, combined with cognitive information technologies and natural language and text analysis technologies multiplies the advantages in terms of cost savings and customer satisfaction.
Customer support	Simplifies and facilitates customer support processes, thanks to Cogito technology. Enables precise understanding of what customers want and solves their problems faster. Option of offering a sophisticated omnichannel customer service (voice, sms, call centre or web).
Corporate intelligence	Cogito's cognitive technology does more than just bring data and information together. It analyses and distills information, providing companies with actionable, timely and strategic intelligence.
Entity extraction	Identifying what is in content and extracting customised entities from it is an inherent and powerful capability of Cogito's semantic technology.
Automatic classification	The ability to classify large volumes of unstructured data and make the richest sources of information available to the entire organisation considerably optimises the company's knowledge management process.

Source: Company

C. … driven by a sharpened industrial and marketing organization

The group's gradual expansion abroad

Expert System has launched its global expansion in an effort to generate a portion of the Group's revenues from sales outside the domestic market, however with a focus on Europe and the US, which has generated particular interest in both the public and private markets.

As shown on the map below, the Group has an extensive global presence, thanks to its 12 regional offices across three continents.

Exhibit 14: The Group's global presence
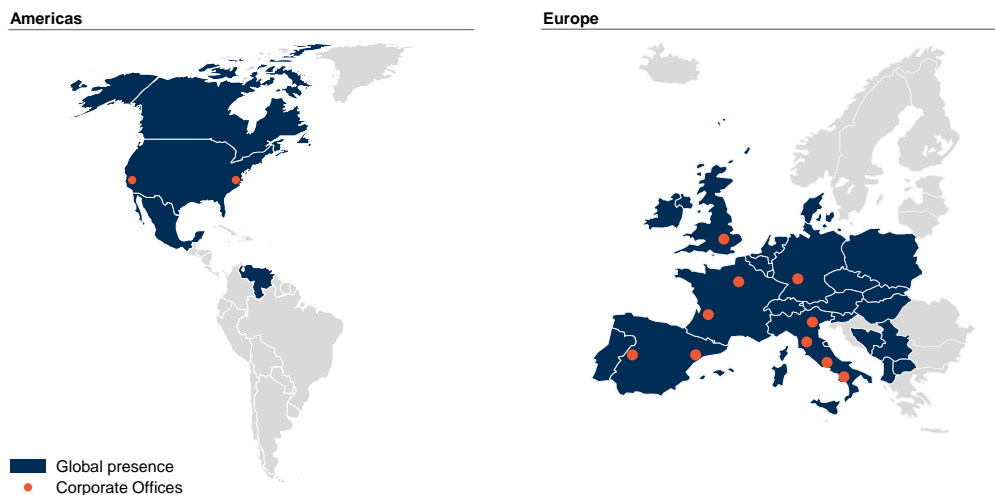
Source: Expert System

The Group's global expansion is also reflected in the breakdown of sales by region from 2013 to 2017, as illustrated in the chart below, with revenues generated outside Italy representing 63% of sales in 2017, up from just 17% in 2013.

Exhibit 15: Gradual global expansion of sales
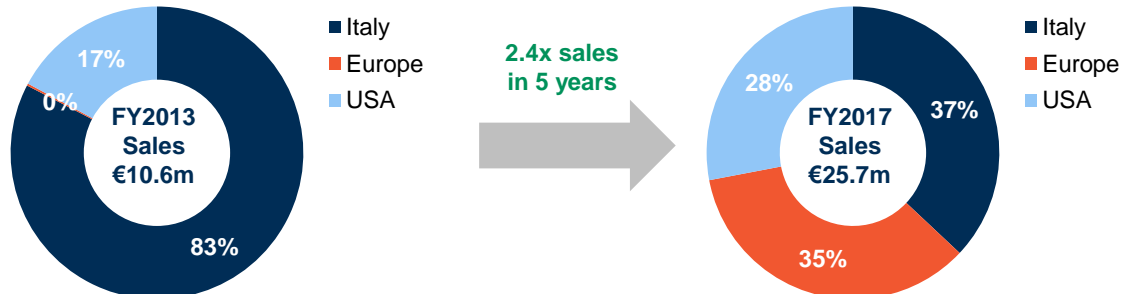
Source: Expert System

The US will represent the biggest market in the semantic analysis, with the Group already having made significant investments in this region. In addition, Expert System's offering is gradually shifting its focus towards bigger companies with large collections of data, most of which are based in the US.

The Group's commercial structure

Expert System markets its solutions via a number of distribution channels, including:

- **Direct distribution (95% of 2017 sales):** sale of solutions via the Group's internal sales force, comprising 31 sales people, up 36.2% in CAGR between 2013-17;
- **Indirect distribution (5% of 2017 sales):** sale of solutions through key partnerships with (i) systems integrators (*e.g.* ATOS, Cap Gemini, Sopra Steria, Cloudera, etc.), and (ii) consulting firms (*e.g.* Deloitte, Accenture, etc.).

The indirect sales method was implemented recently, and is expected to account for a significant portion of revenues in the medium term. Furthermore, in September 2018 the Group signed a sales partnership with Blue Prism, which has been hailed as a positive step given the complementarity of the services offered.

Customer re-targeting strategy

Expert System's activities are exposed to the impacts of seasonal business cycles, given that the Group's revenues are closely correlated with the investment decisions of AI corporate clients. This type of investment is generally concentrated in the second half of the year, when companies have clearer visibility over their performances and investment capabilities.

In order to mitigate such seasonal impacts and increase its market share, the Group is currently in the process of implementing a re-targeting policy geared towards strategic clients that face major challenges, such as multinationals with a greater AI budget and which are more suited to technological change, to make invoicing more consistent throughout the year.

Exhibit 16: A number of multinationals and prestigious Public Administrations have opted for Expert System products

Source: Expert System

Expert System has a diversified customer base. The No. 1, Top 5 and Top 10 customers accounted for 8%, 28% and 40% of 2017 full-year revenues respectively. The sectors that contributed most to 2017 revenues were banking & insurance (30%), governments (19%), and media (15%). The customers' base is also considered to be loyal, with a high retention rate (>95%) specifically thanks to the quality of the services offered by the Group. The customer base is constantly growing, increasing by 29.1% 2013-17 CAGR with 150+ very active customers. The Group intends to strengthen its foothold in sectors where it has already acquired significant experience, and where it has an established range of solutions (banking, insurance, government).

Exhibit 17: Contribution to 2017 revenues by sector
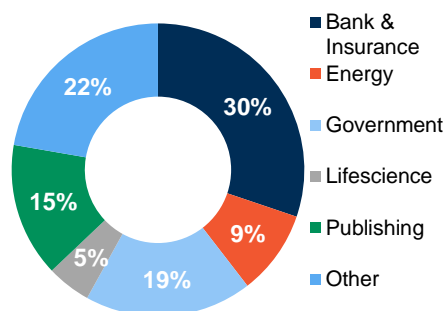
Source: Expert System

Optimisation of the revenue mix

In an effort to improve revenue visibility and reduce volatility, Expert System is currently optimising the revenue mix by transitioning to an offering of recurring yearly licences, rather than perpetual licences. As an example, yearly licences represented 41% of total licences sold in 2017, up from 28% in 2016. Sales of licences are expected to exceed 50% in 2018e.

It should be noted that perpetual licences sell for between €300k and €1.0m with the maintenance representing around 15% of the total contract amount per year.

It should also be pointed out that the maintenance business very broadly applies to perpetual versions; as perpetual licenses are converted to yearly licences over time, the maintenance business

will begin to see a significant decline, which will inevitably be included in the price of yearly licences. This purely technical impact will positively impact revenues in the long run.
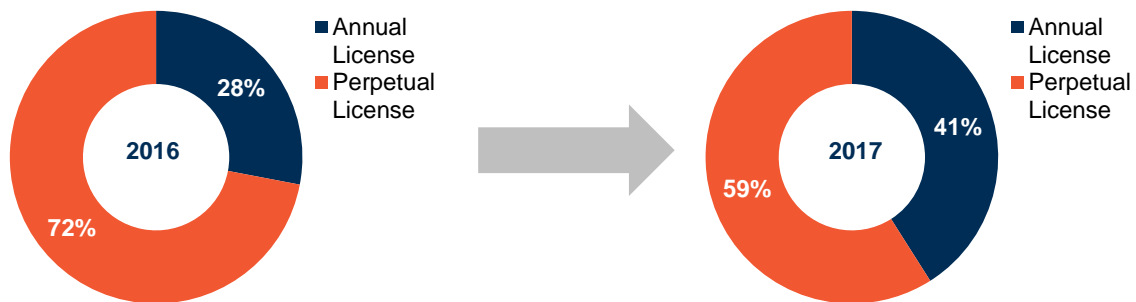
Exhibit 18: Gradual change in the revenue mix

Source: Expert System

Pricing Power: The following factors give the Group more room to strengthen its pricing power: (i) Expert System offers unique technology, enabling its clients to make substantial savings, while improving the reliability of information, (ii) the Group's solid credibility on its core market thanks to its expertise, which has been recognised and validated by customers and analysts, (iii) the gradual extension of the Group's offering in terms of new features (*e.g.* Cogito 14), (iv) the diversification of the client base, with a low churn rate (<5%), (iv) when a new piece of technology is adopted, large client groups tend to retain it in a sustainable manner, tend not to replace it given the considerable efforts made in terms of IT and the change in management, and tend to pay more for the same services offered when compared with smaller companies; this argument is bolstered by the re-targeting strategy currently being rolled out by Expert System, (v) possibility of taking advantage of the diversity of the offering and asymmetry of information on the market to increase prices and educate clients about this practice from the outset, given that the market in question is still in the early stages.

In addition to the factors described above, the Group is currently rolling out appropriate cross-selling and up-selling strategies, with the aim of increasing revenues per client, which amounts to around €300,000 a year, compared to less than €100,000 a few years ago.

Recurring revenues and change in maintenance: 50% of revenues are recurring (multi-year licences, maintenance, etc.).

Invoicing: The client usually advances 20% of the total amount upfront when the order is placed, and pays the remainder upon delivery. It is also worth noting that integration is invoiced separately.

Delivery: Delivery times for standard solutions range between 5 and 6 weeks, and can take up to 6 months for more complex solutions.

Collection of trade receivables: Expert System's commercial activities are characterised by a customer payment schedule that cannot be easily determined and can at times take several months, also depending on the type of assignment and the general prevailing economic situation. The APU payment collection times are random, even if historically there has been no payment default by clients. This is how Expert System normally operates. To finance its working capital requirements, the Group has revolving credit facilities that it draws on for this purpose. The ratio of NPLs within trade receivables is low (0.2% of the total). The company prefers to finance its WCR by drawing down on the RCF, rather than through factoring, for two clear reasons: (i) factoring is more costly than RCFs: in the case of undrawn amounts, only the commitment fee must be paid, and (ii) factoring is unsuited to certain receivables, specifically those relating to large projects carried out for national and European public institutions.

Order backlog: the Group has around six months' visibility over the business, in line with the contribution of recurring revenues to total revenues.

Licence renewal: As mentioned above, the Group is currently implementing a yearly licence model instead of the unlimited model to date, which is expected to represent more than 50% of licence sales

in 2018e. Renewal is not automatic for new clients, as the Group only wishes to test the platform. Within a few years, the Group may switch to a tacit renewal system in order to help save time and increase efficiency when preparing contracts.

D. … offering a strong competitive positioning and providing access to major contracts that bolster the Group's credibility and visibility

1. The Group's competitive positioning

Expert System is the independent leader in cognitive analysis technology for the management of unstructured content. In terms of positioning, the Group is a medium sized player. The market, still in the early stages, is recent and fragmented.

Exhibit 19: Competitive positioning
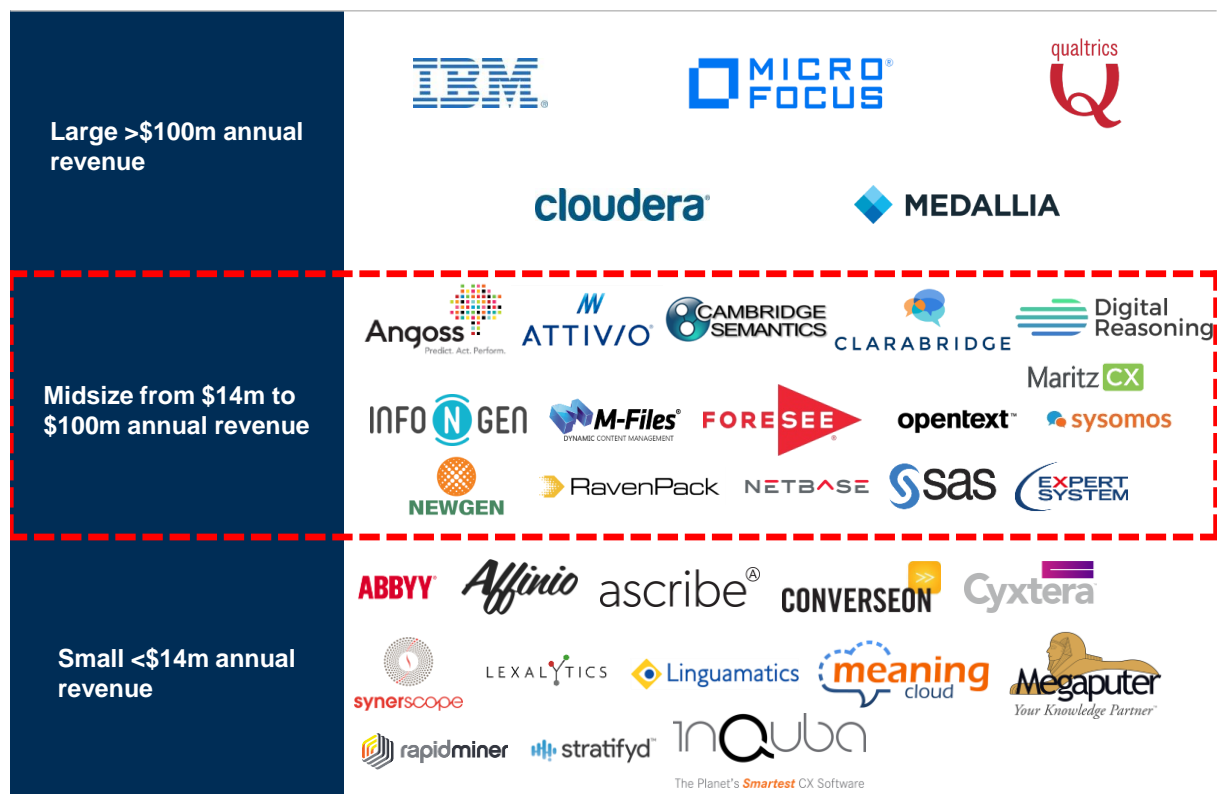
Source: Forrester – Now Tech Market presence Segments: AI-Based text analytics Platforms 2Q2018

2. A solid reputation

Thanks to its unique offering and expertise, Expert System has positioned itself as the independent leader in the sector, thus benefiting from notable influence. The Group has been validated by its market and its cited as the go-to operator by the most influential players and experts in the sector, such as Forrester, Gartner, Google, etc. In addition, the Group has been awarded a number of major distinctions.

One of the most noteworthy examples of market validation is the public procurement contract awarded by the US Department of Defense in March 2017. Of the 15 companies pre-selected for the public procurement process, including US and large scale companies, Cogito was the product that met all of the criteria (i.e. 18). It is worth noting that the company in second position only fulfilled 13 of the 18 criteria, thus highlighting ES' technological advance over the competition.

Source: Company

E. An ambitious strategic plan

1. Organic growth

Backed by its unique technology and aiming to consolidate its leading position, Expert Systems has defined clear strategic goals over the coming years, with a strong focus on organic growth. More specifically:

- to the extent possible, penetrate existing markets with the current offering, specifically in the United States, Germany and France, particularly following the recent restructuring of the German and French teams;
- extension of marketing activities on a global scale;
- greatly speed up the implementation of the indirect channel;
- produce Cogito solutions for specific direct and indirect vertical markets (e.g. insurance);
- target and serve on multinational companies, with concentration targeted on the finance and insurance sectors;
- increase the portion of revenues generated by yearly licence sales (vs perpetual);
- optimise resources in order to increase margins and project profitability.

2. External growth

Acquisitions carried out

Over the last few years, Expert System has made two acquisitions for the total amount of around €14 million, enabling the group to (i) increase in size, (ii) diversify its global foothold (Iberian Peninsula, Western Europe and Canada) and (iii) sharpen its sector expertise (banking, governments, manufacturing, pharmaceuticals).

Exhibit 21: Recent external growth operations carried out by the Group

Closing Date	Target	Target's country	Seller	Acquirer	EV Amount @closing	Transaction's description
27 May 2015	Temis S.A.		Omnes Capital & Inocap SA	Expert System	€ 12m	▪ **Target's business:** Temis S.A. is the France-based company providing text analytics software solutions ▪ **Consideration:** €12m EV (o/w €11m of Equity value and €1m net debt) ▪ **Implied transaction's multiples:** 1.5x Sales, 30.0x EBITDA and 27.5x earnings ▪ **Settlement:** €4m in cash and €7m through Expert System's newly issued ordinary shares paid to the shareholders of Temis ▪ **Rationale:** The acquisition was in line with Expert System's strategy of growth and internationalization. Post acquisition, Expert System has boasted a ranking on all major Western markets like US, Britain, Italy, France, Germany, Spain, Canada and Switzerland. With the acquisition of Temis, Expert system has reached a total value of production well over € 20m, bringing substantially to double its company size than at the time of listing.
10 Dec 2014	Intelligent Software Components SA (iSOCO)		iSOCO SA	Expert System	€ 2m	▪ **Target's business:** ICM (Intelligent Content Management) and iLab (Research Center Innovation) – divisions of iSOCO, is an international company based in Barcelona with contacts in South America, specialized in the development of semantic technology based software for the management of unstructured information aimed at a wide variety of industrial sectors, especially banking, government and pharmaceuticals. ▪ **Consideration:** €2m EV ▪ **Rationale:** The acquisition was part of Expert System's internationalization strategy which, after the opening of the Palo Alto office in Silicon Valley, and the establishment of the UK subsidiary, Expert System Cogito Ltd., further strengthened its presence in Europe through the creation of Expert System Iberia's offices in Barcelona and Madrid and entered into new business opportunities in South America.

Source: Merger Market

External growth strategy

The company remains open to the secondary market, even if this is not the Group's priority in the short term. Indeed, the Group prefers to focus on the integration of its German and French subsidiaries, in order to integrate them within the Group as best as possible and to share with them its best practices.

It should also be noted that goodwill is amortised until the end of 2019E in the amount of approximately €2.2m per year, as recorded in the Italian accounts.

III.   Financial forecasts and valuation

In order to determine the fair value of ES shares, we used two different valuation methods with the same treatment, specifically (i) valuation by the DCF method including a sensitivity analysis (75%) and (ii) the trading multiples method (EV/Sales and EV/EBITDA 2019E - 25%) to which we applied a 30% discount for the size, stock market and liquidity of the share.

By taking these different valuation methods into account, we obtain a price of €1.78 per share. We therefore initiate the coverage of ES with a buy recommendation.

A.   Financial model

Exhibit 22: Financial forecasts

Income statement (€m)	2017a	2018e	2019e	2020e	2021e
Total revenues	**26.1**	**29.1**	**33.2**	**37.9**	**43.2**
COGS	(2.2)	(1.9)	(2.2)	(2.4)	(2.8)
Gross margin	**23.9**	**27.2**	**31.1**	**35.4**	**40.4**
SG&A	(30.0)	(30.7)	(31.2)	(33.5)	(37.0)
R&D	--	--	--	--	--
Other operating profit/(expense)	7.2	7.5	7.5	7.5	7.5
EBITDA	**1.0**	**4.1**	**7.4**	**9.4**	**10.9**
D&A	(7.4)	(7.7)	(7.9)	(6.5)	(6.2)
EBIT	**(6.4)**	**(3.6)**	**(0.5)**	**2.9**	**4.6**
Net interest income/(expense)	(2.2)	(0.7)	(1.7)	(1.7)	(1.7)
Others	(0.1)	--	--	--	--
Pretax profits	**(8.7)**	**(4.3)**	**(2.2)**	**1.2**	**2.9**
Provision for taxes	0.3	--	--	(0.3)	(0.7)
Minority interest	--	--	--	--	--
Net income pre-preferred dividends	**(8.3)**	**(4.3)**	**(2.2)**	**0.9**	**2.2**
Preferred dividends	--	--	--	--	--
Net income (pre-exceptionals)	**(8.3)**	**(4.3)**	**(2.2)**	**0.9**	**2.2**
Post tax exceptionals	--	--	--	--	--
Net income (post-exceptionals)	**(8.3)**	**(4.3)**	**(2.2)**	**0.9**	**2.2**
Basic EPS (€)	**(0.23)**	**(0.12)**	**(0.06)**	**0.02**	**0.06**
DPS (€)	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Dividend payout ratio (%)	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.00**

Growth & margins	2017a	2018e	2019e	2020e	2021e
Sales growth	11.8%	11.5%	14.0%	14.0%	14.0%
EBITDA growth	114.6%	289.7%	80.4%	28.4%	14.9%
EBIT growth	n.m.	n.m.	n.m.	n.m.	59.0%
Net income (pre-excep) growth	n.m.	n.m.	n.m.	n.m.	141.6%
Basic EPS growth	n.m.	n.m.	n.m.	n.m.	141.6%
Gross margin	91.4%	93.5%	93.5%	93.6%	93.6%
EBITDA margin	4.0%	14.0%	22.1%	25.0%	25.1%
EBIT margin	(24.3%)	(12.4%)	(1.5%)	7.7%	10.7%
Net margin	(31.9%)	(14.8%)	(6.6%)	2.4%	5.2%

Source: Company, Midcap Partners

1.   Change in operating margin

Revenues are marked by significant seasonality, with considerably higher revenues recorded in the second half than in the first. In addition, external growth was excluded from our forecasts. The

Professional Services category refers to projects, back office services, migration services, consulting, feature additions and platform customisation for the most demanding clients.

This activity will progressively account for a smaller share of total sales over time (from 45% of total sales in 2016A to 30% in 2021E) because of the lower margins and higher WC consumption, customers taking longer to pay.

We expect the Licence & Maintenance and Professional services divisions to increase 15% and 12% 2018-21E CAGR respectively.

Exhibit 23: Top line forecasts

Revenues	2016a	2017a	2018a	2019a	2020a	2021a	CAGR 2018-21
Sales	23.4	26.1	29.1	33.2	37.9	43.2	14.0%
Δ YoY	42.6%	11.8%	11.5%	14.0%	14.0%	14.0%	
License & Maintenance	12.7	17.1	19.6	22.6	26.0	29.9	15.0%
Δ YoY	--	34.0%	15.0%	15.0%	15.0%	15.0%	
Professional Services	10.4	8.9	9.3	10.5	11.7	13.1	12.0%
Δ YoY	--	(14.6%)	5.0%	12.0%	12.0%	12.0%	
Other	0.2	0.2	0.2	0.2	0.2	0.2	0.0%
Δ YoY	--	(21.8%)	0.0%	0.0%	0.0%	0.0%	
M&A	–	–	–	–	–	–	
Δ YoY	--	--	0.0%	0.0%	0.0%	0.0%	

■ License & Maintenance   ■ Professional Services   ■ Other
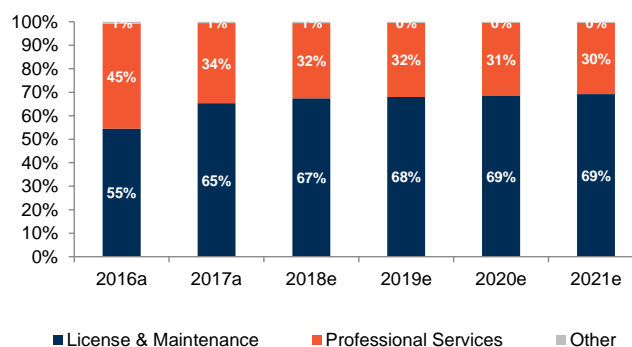
Source: Company, Midcap Partners

The ES EBITDA margin is expected to rise dramatically following the improvements expected in the Group's historically low margins, increasing to 25.1% by 2021e. This will be made possible by (i) the modular effect of the company's business model with a majority share of fixed and semi-fixed costs (representing around 79% of total operating costs in 2017), (ii) the streamlining of the product offering from perpetual to yearly licensing, (iii) the streamlining of the commercial strategy with the roll-out of up-selling and cross-selling strategies, (iv) the integration of the French and German subsidiaries.

2. Changes in the Group's financial structure

The Group is in full expansion, which requires significant financing to ensure its development. Between 2014 and the first half of 2018, the Group obtained €22.8 million in borrowings and €34.9 million in equity, totalling €57.7 million, mainly intended to finance acquisitions & investments. Revenues and CF are expected to see much lower volatility over the coming years, thanks to the roll-out of the Group's new strategy.

Exhibit 24: Changes in the Group's financial structure
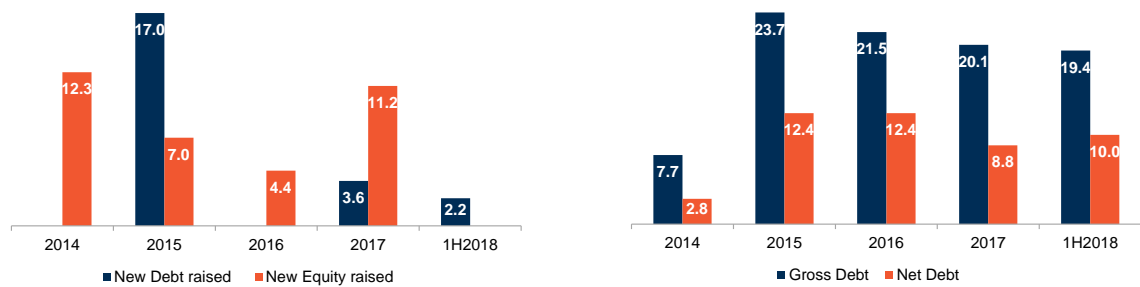
Source: Company

B. Expert System's past performance

As shown in the graph below, ES has underperformed its benchmark index and the peer group from 01/01/2018 (-14.0% vs -12.5% on average for the peer group), mainly due to the limited liquidity of the share.

Exhibit 24: Historical performance (rebased 100 from 01/01/2018)
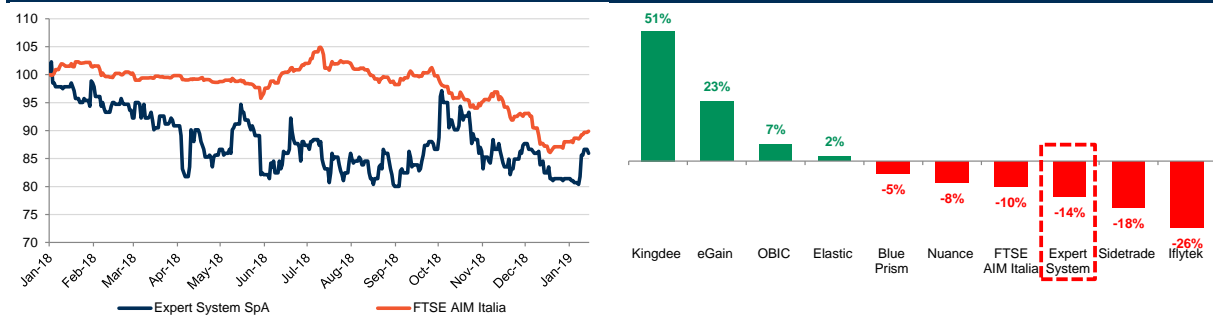
Source: FactSet, Midcap Partners

C. DCF method with a sensitivity analysis

Our DCF method is simple, based on our projections for 2019E-21E and applying assumptions presented in the table below until 2028E, which we believe to be conservative (*e.g.* growth rate and margins).

Exhibit 25: Assumptions applied for DCF valuation

Parameter	Value
Perpetual growth rate	3.0%
Assumptions applicable to WACC calculation	
Risk-free rate (BTP)	2.9%
Market risk premium	7.5%
β	1.25x
Cost of equity	12.2%
Cost of debt post taxes	1.4%
Net debt/(Equity+Net debt) @Market value	18.3%
Income tax rate (IRES)	24.0%
WACC	**10.3%**

Source: Midcap Partners

As shown in the diagram below, the discounted cash flows calculated above are expected to result in a price of €1.43/share.

Exhibit 26: Calculation of the share price derived from the DCF method

DCF valuation	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E
Sales	33.2	37.9	43.2	48.3	53.1	57.5	61.6	65.2	68.5	70.5
Δ growth	14.0%	14.0%	14.0%	11.8%	9.9%	8.4%	7.1%	6.0%	5.0%	3.0%
EBIT	(0.5)	2.9	4.6	6.7	8.6	10.0	11.1	12.1	13.0	13.5
EBIT margin	(1.5%)	7.7%	10.7%	14.0%	16.1%	17.4%	18.1%	18.6%	19.0%	19.2%
(-) Taxes	0.0	(0.3)	(0.7)	(1.2)	(1.6)	(2.0)	(2.3)	(2.5)	(2.7)	(2.8)
Tax rate	0.0%	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%	24.0%
NOPAT	(0.5)	2.6	3.9	5.5	6.9	8.0	8.9	9.6	10.3	10.7
(+) D&A	7.9	6.5	6.2	5.8	5.5	5.5	5.5	5.5	5.5	5.5
D&A % of sales	23.6%	17.3%	14.4%	12.0%	10.4%	9.6%	8.9%	8.4%	8.0%	7.8%
WC	12.3	14.2	16.3	18.6	21.1	23.9	26.9	30.0	33.3	36.6
(-) Δ WC	(1.3)	(1.9)	(2.1)	(2.3)	(2.5)	(2.8)	(3.0)	(3.1)	(3.3)	(3.4)
Δ WC % of sales	(4.0%)	(4.9%)	(4.8%)	(4.8%)	(4.8%)	(4.8%)	(4.8%)	(4.8%)	(4.8%)	(4.8%)
Operating CF	6.0	7.3	8.1	9.0	9.9	10.8	11.4	12.0	12.5	12.8
(-) CapEx	(5.5)	(5.5)	(5.5)	(5.8)	(5.5)	(5.5)	(5.5)	(5.5)	(5.5)	(5.5)
CapEx % of sales	16.6%	14.5%	12.7%	12.0%	10.4%	9.6%	8.9%	8.4%	8.0%	7.8%
FCFF	0.5	1.8	2.6	3.2	4.4	5.3	5.9	6.5	7.0	7.3
Discount factor	0.9	0.8	0.7	0.7	0.6	0.6	0.5	0.5	0.4	0.4
Cash conversion	n.m.	61.1%	55.6%	47.8%	51.1%	52.6%	53.1%	53.5%	53.9%	54.0%
Discounted FCFF (perceived)	0.5	1.5	1.9	2.2	2.7	2.9	3.0	3.0	2.9	2.8
Terminal trailing EV/EBITDA 2028E	5.5x									
Terminal Value	103.9	3.0%	TGR							
Discounted Terminal Value	39.3	62.7%	% of EV							
EV	62.7									
(-) Preferred equity	0.0									
(-) Minority interests	0.0									
(-) (Net debt) / Net cash	(10.0)									
(+/-) Readjusted other liabilities & commitments	(2.0)									
(+) Investments in associates & JVs	4.9									
Equity value	55.6									
Shares outstanding	38.9									
Price Target	1.43									

Source: Midcap Partners

The table presented below shows the sensitivity of the share price determined by changes in assumptions over the long term.

Exhibit 27: DCF sensitivity – Sensitivity of the share price based on the WACC and TGR (in euros)

		TGR				
		2.0%	2.5%	3.0%	3.5%	4.0%
WACC	9.3%	1.41	1.57	1.74	1.93	2.16
	9.8%	1.29	1.43	1.57	1.74	1.92
	10.3%	1.19	1.30	1.43	1.57	1.73
	10.8%	1.09	1.19	1.31	1.43	1.56
	11.3%	1.01	1.10	1.20	1.30	1.42

Source: Midcap Partners

D. Analogical approach via the trading multiples method

ES is a pure play in the cognitive AI market. In our opinion, the Group is suitably positioned in a segment of the market presenting a bullish megatrend.

We believe that the trading multiples valuation method is appropriate to value ES. The table below presents ES's comparable peers, independent of their market valuation levels.

Exhibit 28: Presentation of the peer group

	eGain (USA)	Iflytek (China)	NUANCE (USA)	SIDETRADE (France)	VERITONE (USA)	OBIC (Japan)	Kingdee (China)	cloudera (USA)
Description	eGain Corporation provides customer service infrastructure solutions for companies involved in electronic commerce. The Company offers solutions both as Web-based hosted application service through its eGain Hosted Network and as installed software for in-house implementation.	Iflytek Co.,Ltd specializes in speech intelligence and artificial intelligence technology. The Company also develops chip product, voice messaging software and e-government system integration software.	Nuance Communications, Inc. provides speech and imaging solutions for businesses and consumers around the world. The Company's products include a speech recognizer, call steering, and a product that converts text into speech.	Sidetrade specializes in financial software solutions. The Company assists corporate financial departments for the development and implementation of cash flows management solutions.	Veritone, Inc. operates as a cloud-based artificial intelligence media technology company. The Company develops a cloud-based ecosystem that enables real-time audio and video processing, audience analytics, search, retrieval, replay, and share capabilities. Veritone offers visual and audio discovery applications.	OBIC Co., Ltd. provides computer system integration, office automation, consultation, and system support services primarily for small and medium size companies. The Company sells, leases, and maintains computers, peripherals, and related systems. OBIC also develops and sells customized software and network systems.	Kingdee International Software Group Company Limited, through its subsidiaries, develops and sells enterprise management software, e-commerce application software and middleware software. The Company also provides internet-based services and setting up e-commerce platforms for enterprises. In addition, Kingdee provides solution consulting and technical support services.	Cloudera, Inc. provides enterprise data management solutions for machine learning and advanced analytics. It operates through two segments: Subscription and Services. The company's products include enterprise, analytical, and operational data hubs, and data science & engineering.
Employees	464	8,659	10,400	213	219	2,034	n.a.	1,648
Currency	US$	CNY	US$	EUR	US$	JPY	RMB	US$
Revenues	61.3m / +5.3% YoY	5,445m / +64% YoY	2,069m / +4.7% YoY	21.6m / +19.8% YoY	14.4m / +61.7% YoY	66.8bn / +8.7% YoY	2,303m / +23.7% YoY	367.4m / +40.8% YoY
EBITDA / Margin	1.7m / 2.7%	756.8m / 13.9%	373.9m / 18.1%	4.5m / 20.9%	-46.5m / negative	32.8bn / 49.1%	782.5m / 34.0%	-378.2m / nagative
EBIT/Margin	-1.0m / negative	569m / 10.4%	163.6m / 7.9%	2.3m / 10.8%	-46.8m / negative	32.3bn / 48.4%	420.8m / 18.3%	-390.3m / nagative
Net income / Margin	-2.0m / negative	434.7m / 8%	-159.9m / negative	2.0m / 9.3%	-59.6m / nagative	26.3bn / 39.3%	323.6m / 14.0%	-385.8m / nagative
R&D/Sales	20.3%	8.0%	14.8%	n.a.	96.9%	n.a.	15.0%	58.7%
Net debt (cash rich)	-2.3m	-992.8m	745.4m	-5.6m	-69.1m	-109.5bn	-1,203.0m	-371.1m
Net Gearing @BV	n.m.	n.m.	43.4%	n.m.	n.m.	n.m.	n.m.	n.m.
Leverage ratio	n.m.	n.m.	2.0x	n.m.	n.m.	n.m.	n.m.	n.m.

Source: Midcap Partners

We have obtained an average target price of €2.82/share by using the trading multiples valuation method (EV/Sales & EV/EBITDA 2019E), as shown in the table below. As stated above, we applied a 30% discount reflecting the size, stock market and liquidity of the share.

Exhibit 29: Valuation using the trading multiples method

Peers	Market Cap. (€m)	2018E-20E Sales CAGR	EV/Sales 2019E	EBITDA margin 2019E	EV/EBITDA 2019E
eGain Corp.	174	10.2%	2.6x	6.8%	37.9x
Iflytek Co., Ltd.	7,828	42.4%	5.0x	14.0%	36.1x
Nuance Communications, Inc.	3,807	3.3%	2.9x	32.5%	9.8x
Sidetrade SA	77	17.6%	2.3x	14.8%	15.8x
OBIC Co., Ltd.	7,220	6.5%	9.8x	52.2%	18.8x
Kingdee International Software Group Co., Ltd.	2,614	21.0%	5.6x	26.6%	21.1x
Cloudera, Inc.	2,745	23.3%	4.3x	n.m.	n.m.
Expert System SpA	45	14.0%	1.5x	22.1%	6.6x
Average		17.8%	4.6x	24.5%	23.3x
Average multiple @30% discount			3.2x		16.3x
Implied Share Value (using mean)			2.67		2.98

Source: Midcap Partners

An overall valuation of €1.78/share

Exhibit 30: Valuation summary

Method	Coefficient	Valuation
Discounted cash flows (DCF)	75%	€1.43
Trading multiples	25%	€2.82
Valuation outcome	100%	€1.78

Source: Midcap Partners

We are initiating the coverage of ES with a buy recommendation, combined with a price target of €1.78/share.

IV. Appendices

A. Appendix 1: Examples of uses of Cogito

How Cogito works

Cogito for RPA

Cogito for GDPR (processing sensitive data)
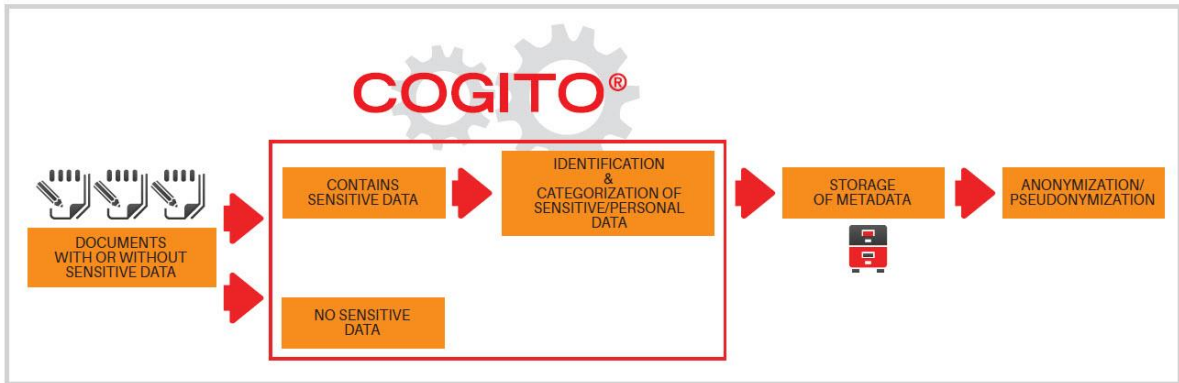
Cogito Chatbot

Cogito for Claim

B. Appendix 2: History of the Group

Source: Company

C. Appendix 3: Presentation of the management team

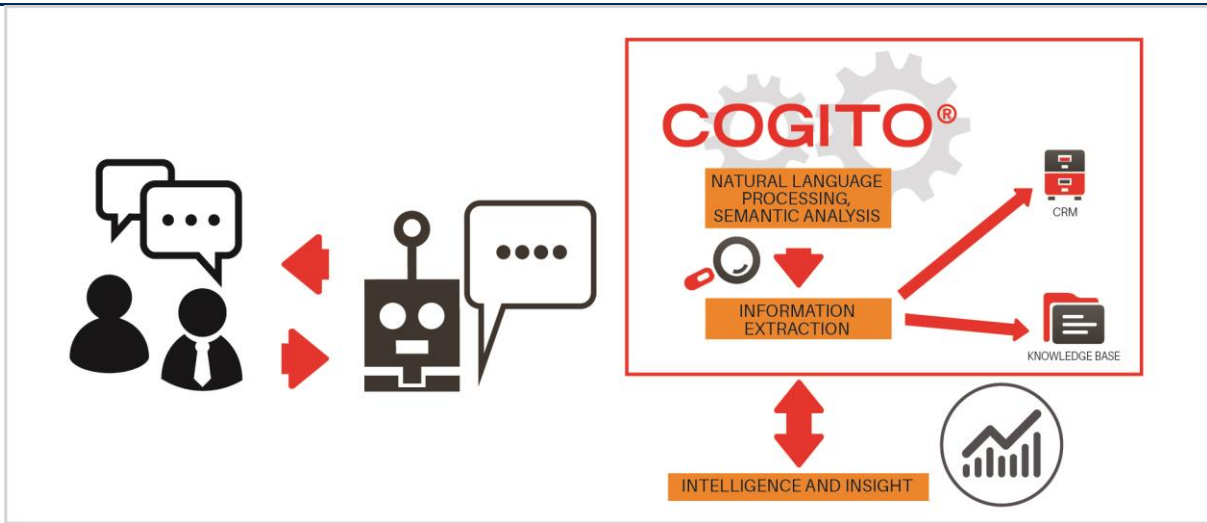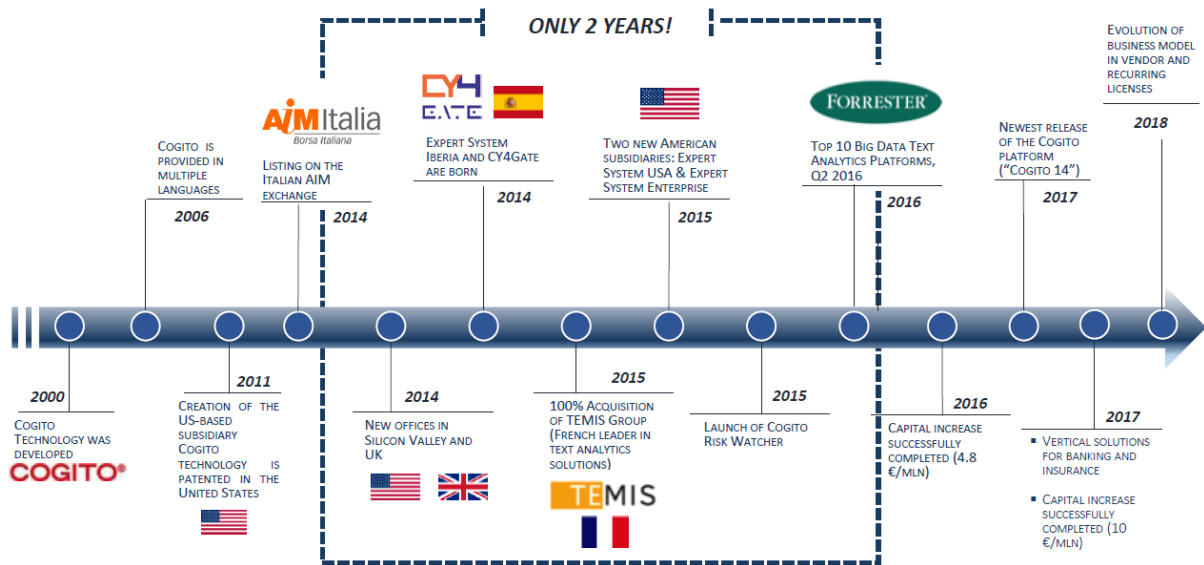| Manager	Description
	Stefano Spaggiari, Founder and CEO For many years now, Stefano has led Expert System as CEO. His guidance has led the company to achieve a leading position, receive prestigious international awards, and establish itself among the top ICT companies in the world in the field of information management. He founded this company with the idea to develop software to support other companies with the analysis of information. Through the years, he has always carried out this idea with great passion and determination. Recently, Stefano successfully managed Expert System's IPO and the company's internationalization process. Stefano holds an EMBA from the Alma Graduate School of the University of Bologna, as well as a degree in Computer Science from the University of Modena, Italy.
	Marco Varone, Founder, President & CTO Marco, founder, Chairman & Chief Technology Officer of Expert System, is one of the leading experts on semantic technology and natural language processing. He created the Cogito platform, which is the basis of all Expert System's products. He has worked in the field application of semantic technology in every advanced context: search engines, text analytics, natural language interfaces, Q & A systems, automatic categorization and many others. He has led the company throughout its consistent growth and has helped Expert System to achieve major successes in various business sectors. He coordinates all activities of Research and Development and in his spare time, he writes about these issues on the company blog and his own blog, Semanticamente.
	Claudio Palmolungo, Executive Vice President Europe Claudio leads Expert System's strategic business development in Europe. Prior joining Expert System, he was Senior Vice President, head of the International activities at Store Electronic Systems where he led the company's international expansion, creating direct and indirect sales channels and subsidiaries in Italy, Spain, Canada and the U.S. Claudio started his career at Magneti Marelli France, and at Accenture, where he spent several years managing pan-European projects in sales, sourcing and supply chain in a variety of sectors including automotive, retail, high tech and banking. He holds a degree in Business Administration from the University of Turin and from ESCP Europe, in Paris.
	Maria Guidotti Mistrali, CFO Maria is the CFO of Expert System where she oversees the company's financial operations, including accounting and taxation, and financial planning and analysis. She joined the company in 2013 as Finance Manager where she reorganized financial operations in support of the company's entry on the Italian stock exchange. As CFO, she has helped strengthen the company's international expansion process, including the establishment of CY4Gate and the acquisition of TEMIS and two business units of ISOCO. Prior to Expert System, she served as Finance Manager for multinational organizations in the pharmaceutical and utilities industries. Maria holds a degree in Business Administration from the University of Modena (Italy).

Andrea Melegari, SEVP, Defense, Intelligence & Security
As Senior Executive Vice President, Defense, Intelligence & Security, Andrea guides the development of complex projects using semantic technology to support the Intelligence process. After joining Expert System in 2000, Andrea founded and led the company's Intelligence Division for 12 years, and in 2014, he helped guide the company's joint venture with Elettronica that led to the creation of CY4Gate, a global organization focused on Cyber Electronic Warfare and Intelligence, where he currently serves as Chief Marketing & Innovation Officer. He also serves on the Board of Directors at Expert System, CY4Gate and Expert System USA. Previously, he was an IT consultant and instructor at the Modena Military Academy (Italy) for more than 10 years. He also founded the web agency Expertweb, which was acquired by Banzai. Andrea holds a degree in Computer Science from the University of Modena.

Francesca Petronio, Corporate HR Director
Francesca is responsible for implementing the Group's human resources strategies that enable it to recruit, train and retain a high performing workforce. In addition to leading Expert System's recruitment and staffing activities, Francesca manages the HR team where she directly oversees training and professional development. Before joining Expert System in 2011, she spent 10 years at the multinational HR services company Randstad, where she held a variety of positions, including Human Resources Project Manager.
Francesca holds a degree in modern literature from the University of Bologna.

Christophe Aubry, CEO, Expert System Enterprise
Christophe is the CEO of Expert System Enterprise. He managed day-to-day operations in North America for TEMIS Inc. and established long lasting relationships with company's customers and partners. As the former co-founder and Vice President, Professional Services at TEMIS for over 10 years, he supervised customer deployments in all geographies and led strategic service activities such as consulting, project management and training for customers and certified partners. Previously, he was the project leader for IBM's "Technology Watch," an innovative scientific watch application. Christophe holds a master's degree in mathematical and computer sciences from the University of Orléans (France).

Daniel Mayer, CMO and SVP for Products, Expert System Enterprise
Daniel is CMO and SVP for Products of Expert System Enterprise. He joined Expert System following its acquisition of TEMIS, where as VP of Product & Marketing, he shaped and promoted the award-winning Luxid® line of text analytics products. With 20 years of experience in marketing and product strategy throughout the IT value chain, Daniel's passion is in crossing the chasm by helping organizations leverage technologies that deliver significant business value. Daniel holds both a Masters degree in Business from HEC Paris and a Masters in Computer Science from Télécom ParisTech.

Marcello Pellacani, VP for Publishing market & Director of Expert System UK
Marcello is the VP, Publishing where he is responsible for directing products, strategy and marketing activities covering the European publishing market. He is also the director of Expert System UK where he is focused on building strategic alliances with technology partners. Formerly, he was the President and CTO of Expertweb, an advanced IT solutions developer and consultancy, where he helped double the company's revenue in just three years before its purchase by Banzai Group (now ePrice). Marcello has co-founded numerous successful IT start-ups and has held positions at Olivetti in its Formula 1 team and at IBM. Marcello holds a degree in Mathematics and a degree in Computer Science from the University of Modena, Italy.

Louis Andre, CEO, Expert System USA
Louis is the CEO of Expert System USA. Louis has a distinguished career in security and intelligence in the public and private sector. He most recently served as COO for Kiernan Group Holdings and previously as Senior Vice President for Intelligence Business Strategy at CACI International. Louis spent his public sector career with the U.S. Defense Intelligence Agency (DIA) where he held a variety of senior roles in analytics and management, including as Chief of the Global Analysis Division and Chief and founding member of the Counterterrorism Branch, the organizational precursor to the Joint Intelligence Task Force – Combating Terrorism. His final role at DIA included the dual responsibilities of Chief of Staff and COO. Among other achievements, he received the Presidential Rank Award for both Distinguished Executive and Meritorious Executive.
Louis attended the School of Foreign Service, Georgetown University, the Federal Executive Institute, the Intelligence Fellows Program, and the Program for Senior Officials in National Security at Harvard University.

Giuseppe Strafforello, Executive Vice President and CTO, Expert System USA
Giuseppe exercises dual roles as both the lead technical executive and the primary operational manager of key Expert System USA programs in the Federal market sector. In those roles, he oversees teams of linguists and technologists providing highly-customized software products and services to extant customers while simultaneously developing the technology and business strategies needed to posture the company for future growth. An experienced executive and accomplished software engineer, Giuseppe's career has been marked by innovative solutioning, execution excellence, and thought-leadership. Giuseppe holds a Masters of Science in Physics from the University of Turin, Italy.

Source: Company

D. Appendix 4: Group governance model

A growth model driven by a structured, loyal and stable management team

The company's governance structure is made up of real experts (both financial and technical – see Appendix 3) and complies with the recommendations issued by the Italian stock market regarding governance, including two independent directors.

The offices of Chairman of the Board of Directors and Chief Executive Officer are separate, and are held by Marco Varone and Stefano Spaggiari, respectively.

Type of committee	# members	o/w independents	% indpendence
BoD	8	2	25.0%
Audit	5	5	100.0%

E. Appendix 4: Management incentive scheme

Three incentive plans have been approved addressed to members of the board, employees, agents and consultants, with a total diluting effect of 6.6% (assuming full attribution).

2018-2020 stock grant plan: provides for the allocation of a max 800k shares, free of charge, subject to the achievement of specific performance and/or personal objectives in each of the three financial years closing 31 December 2018, 2019 and 2020, respectively. The dilutive effect is equal to 2.19% (assuming full attribution) and there is a lock up period of 90 days from the date of assignment.

2018-2020 stock option plan: attributes 1.2m options conditional on subscribing, at a €1.04 per share, EXSY ordinary shares (1:1 parity), up to a max of € 1.26m through the issuing of a max of 1.2m new ordinary shares. The entitlement to the option rights is subject to the achievement of specific objectives, both performance and personal, set from time to time for each beneficiary. Options will be assigned on a personal basis and will be non-transferable. The dilutive effect is equal to 3.25%.

The third plan was approved after the acquisition of Temis (**2016-2020 Temis Stock Grant Plan**), involving the free allocation of a max of 1m ordinary shares, free of charge, in 3 tranches assigned after one, two and three years, respectively, from the date of approval of the Plan. The aforementioned initiative was considered following the completion of the acquisition of Temis S.A. by Expert System, to focus the attention of certain Temis employees and managers on factors of strategic interest for the Group post-acquisition. The hypothesised plan of full allocation of the residual shares entails a dilution of around 1%.

F. Appendix 5: Group ownership structure

The founders and historical managers hold c.27% of the capital and voting rights in the company, the rest being assigned to the public float. It should also be noted that no preferential shares are currently in circulation.

Ownership structure

- Management
- Free Float

Voting structure

- Management
- Free Float

V. Financials

Income statement (€m)	2016	2017	2018E	2019E	2020E	2021E
Sales	**23.4**	**26.1**	**29.1**	**33.2**	**37.9**	**43.2**
Δ YoY	*42.6%*	*11.8%*	*11.5%*	*14.0%*	*14.0%*	*14.0%*
Gross profit	**21.0**	**23.9**	**27.2**	**31.1**	**35.4**	**40.4**
Gross margin	*90.0%*	*91.4%*	*93.5%*	*93.5%*	*93.6%*	*93.6%*
SG&A	(30.6)	(30.0)	(30.7)	(31.2)	(33.5)	(37.0)
Others	7.4	7.2	7.5	7.5	7.5	7.5
EBITDA	**(2.2)**	**1.0**	**4.1**	**7.4**	**9.4**	**10.9**
margin	*(9.6%)*	*4.0%*	*14.0%*	*22.1%*	*25.0%*	*25.1%*
D&A	(6.3)	(7.4)	(7.7)	(7.9)	(6.5)	(6.2)
EBIT	**(8.5)**	**(6.4)**	**(3.6)**	**(0.5)**	**2.9**	**4.6**
margin	*(36.6%)*	*(24.3%)*	*(12.4%)*	*(1.5%)*	*7.7%*	*10.7%*
Net interest income/(expense)	(0.2)	(2.2)	(0.7)	(1.7)	(1.7)	(1.7)
Others	(0.0)	(0.1)	0.0	0.0	0.0	0.0
EBT	**(8.8)**	**(8.7)**	**(4.3)**	**(2.2)**	**1.2**	**2.9**
Provision for taxes	0.6	0.3	0.0	0.0	(0.3)	(0.7)
Implied tax rate	*n.s.*	*n.s.*	*0%*	*0%*	*24%*	*24%*
Minority interest	0.0	0.0	0.0	0.0	0.0	0.0
Net income	**(8.2)**	**(8.3)**	**(4.3)**	**(2.2)**	**0.9**	**2.2**

Balance sheet (€m)	2016	2017	2018E	2019E	2020E	2021E
Net PP&E	0.9	0.8	0.6	0.4	0.2	0.0
Net intangibles	18.4	16.9	15.0	12.8	12.0	11.4
Investments	0.4	0.4	0.4	0.4	0.4	0.4
Other long-term assets	2.1	1.8	1.8	1.8	1.8	1.8
Non current assets	**21.8**	**19.9**	**17.7**	**15.3**	**14.3**	**13.6**
Inventory	0.6	0.1	0.1	0.1	0.1	0.1
Accounts receivable	10.2	12.4	13.2	14.5	16.6	18.9
Other current assets	15.7	12.9	12.9	12.9	12.9	12.9
Cash & cash equivalents	9.1	11.2	8.0	6.8	7.0	8.6
Current assets	**35.6**	**36.6**	**34.1**	**34.4**	**36.6**	**40.5**
Total assets	**57.4**	**56.5**	**51.8**	**49.7**	**50.9**	**54.1**
Total common equity	16.4	19.3	15.0	12.8	13.7	15.9
Minority interest	0.0	0.0	0.0	0.0	0.0	0.0
Shareholders' equity	**16.4**	**19.3**	**15.0**	**12.8**	**13.7**	**15.9**
LT Debt	15.3	14.7	14.7	14.8	16.5	18.1
Other long-term liabilities	3.1	3.1	3.1	3.1	3.1	3.1
Non current liabilities	**18.3**	**17.7**	**17.8**	**17.9**	**19.5**	**21.2**
ST Debt	6.2	5.4	5.0	4.9	3.4	2.4
Other current liabilities	13.7	7.7	7.7	7.7	7.7	7.7
Accounts payable	2.7	6.4	6.4	6.4	6.6	6.9
Current liabilities	**22.6**	**19.5**	**19.1**	**19.0**	**17.7**	**17.0**
Total liabilities & equity	**57.4**	**56.5**	**51.8**	**49.7**	**50.9**	**54.1**

Cash flow statement	2016	2017	2018E	2019E	2020E	2021E
Operating Cash Flow	2.9	0.7	4.1	7.4	9.2	10.1
Δ Working capital	(0.9)	(3.3)	(0.7)	(1.3)	(1.9)	(2.1)
Cash flow from operations	**1.9**	**(2.5)**	**3.3**	**6.0**	**7.3**	**8.1**
CapEx	(6.1)	(5.9)	(5.5)	(5.5)	(5.5)	(5.5)
FCF	**(4.2)**	**(8.4)**	**(2.2)**	**0.5**	**1.8**	**2.6**
Disposals	0.0	0.0	0.0	0.0	0.0	0.0
Acquisitions	0.0	0.0	0.0	0.0	0.0	0.0
Others	(0.2)	0.8	0.0	0.0	0.0	0.0
Cash flow from investing	**(6.3)**	**(5.0)**	**(5.5)**	**(5.5)**	**(5.5)**	**(5.5)**
Δ Debt	(2.4)	(1.5)	(0.4)	0.0	0.1	0.6
Δ Equity	4.4	11.2	0.0	0.0	0.0	0.0
Dividends paid (common & pref)	0.0	0.0	0.0	0.0	0.0	0.0
Other financing cash flows	0.2	0.1	(0.7)	(1.7)	(1.7)	(1.7)
Cash flow from financing	**2.2**	**9.8**	**(1.1)**	**(1.7)**	**(1.6)**	**(1.1)**
Currency translation effect on cash	0.0	0.0	0.0	0.0	0.0	0.0
Δ cash	**(2.2)**	**2.2**	**(3.2)**	**(1.2)**	**0.2**	**1.5**

KEY RATIOS	2016	2017	2018E	2019E	2020E	2021E
Δ Sales	42.6%	11.8%	11.5%	14.0%	14.0%	14.0%
Δ EBITDA	n.m.	289.7%	80.4%	28.4%	28.4%	14.9%
Δ EBIT	n.m.	n.m.	n.m.	n.m.	687.9%	59.0%
Δ Net income	n.m.	n.m.	n.m.	n.m.	142.1%	141.6%
Gross profit	90.0%	91.4%	93.5%	93.5%	93.6%	93.6%
EBITDA margin	(9.6%)	4.0%	14.0%	22.1%	25.0%	25.1%
EBIT margin	(36.6%)	(24.3%)	(12.4%)	(1.5%)	7.7%	10.7%
Net margin	(35.1%)	(31.9%)	(14.8%)	(6.6%)	2.4%	5.2%
EPS	(0.29)	(0.23)	(0.12)	(0.06)	0.02	0.06
DPS	0.00	0.00	0.00	0.00	0.00	0.00
Dividend Yield	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
WC in % of sales	34.9%	23.4%	23.5%	24.7%	26.6%	28.1%
DIO	98	16	16	16	16	16
DSO	160	173	165	160	160	160
DPO	30	25	25	25	25	25
FCF	(4.2)	(8.4)	(2.2)	0.5	1.8	2.6
FCF yield	n.m.	n.m.	(4.9%)	1.2%	4.0%	5.8%
Taux de conversion (FCF/EBITDA)	n.m.	n.m.	(53.2%)	7.0%	18.9%	23.7%
CAPEX/Sales	26%	22%	19%	17%	15%	13%
RoE	(49%)	(47%)	(25%)	(16%)	7%	15%
RoA	(14%)	(15%)	(8%)	(4%)	2%	4%
RoCE	(30%)	(21%)	(12%)	(2%)	9%	13%
Net Gearing	75%	46%	78%	101%	93%	75%
Net leverage ratio	(5.5x)	8.4x	2.9x	1.8x	1.4x	1.1x
EV/Sales			1.7x	1.5x	1.3x	1.1x
EV/EBITDA			11.9x	6.6x	5.2x	4.5x
EV/EBIT			n.m.	n.m.	16.7x	10.5x
P/E			n.m.	n.m.	52.4x	21.7x

MIDCAP PARTNERS vs CONSENSUS

	2018e		2019e		2020e	
	Midcap Partners	Consensus	Midcap Partners	Consensus	Midcap Partners	Consensus
Sales	29.1	30.0	33.2	34.0	37.9	n/a
EBITDA	4.1	5.0	7.4	7.0	9.4	n/a
EBIT	(3.6)	n/a	(0.5)	n/a	2.9	n/a
EPS	(0.12)	(0.11)	(0.06)	(0.01)	0.02	n/a

VI. Disclaimer

This document may refer to valuation methods defined as follows:

1/ DCF method: discounting future cash flows generated by the business's operations. Cash flows are determined using the analyst's financial forecasts and models. The discount rate used corresponds to the weighted average cost of capital, which is defined by the weighted average cost of the company's debt and the theoretical cost of equity as estimated by the analyst.

2/ Comparables method: application of stock-market valuation multiples, or multiples observed for recent transactions. These multiples may be used as benchmarks and be applied to the company's financial aggregates to determine its valuation. The sample is prepared by the analyst based on the company's characteristics (size, growth, profitability etc.). The analyst may also apply a premium/discount based on his perception of the company's characteristics.

3/ Asset-based method: estimation of the value of the equity on the basis of the revalued assets and corrected for the value of the liability.

4/ Discounted dividend method: discounted future value of estimated dividend flows. The discount rate applied is generally the cost of capital.

5/ Sum of the parts: this method consists of estimating a company's different operations by using the most appropriate valuation method for each one, then doing the sum.

Recommendation scale:

Buy: expected over-performance above 10% compared to the market within 6 to 12 months
Neutral: expected to outperform or under-perform the market within a range of +10% and -10%, within 6 to 12 months
Sell: expected to under-perform the market by more than 10% within 6 to 12 months

Detection of conflicts of interest:

Business	Closing price (€)	Recommendation	Warning
Expert System SpA	1.25	Buy	G

A LOUIS CAPITAL MARKETS – MCP or any related legal entity holding more than 5% of all of the capital issued by the issuer;
B The issuer holds more than 5% of all of the capital issued by LOUIS CAPITAL MARKETS - MCP or any related legal entity;
C LOUIS CAPITAL MARKETS - MCP, alone or with other legal entities, is related to the issuer via other significant financial interests;
D LOUIS CAPITAL MARKETS - MCP or any legal entity related to it is a market maker or a liquidity provider with which a liquidity contract has been concluded in relation to the issuer's financial instruments;
E LOUIS CAPITAL MARKETS - MCP or any legal entity related to it has, within the last twelve months, acted as lead manager or joint lead manager for an offer relating to the issuer's financial instruments, and that offer has been made public;
F LOUIS CAPITAL MARKETS - MCP or any legal entity related to it is a party to any other agreement with the issuer concerning the provision of investment services relating to the corporate activity;
G LOUIS CAPITAL MARKETS - MCP and the issuer have agreed on the supply by the former to the latter of a service for the production and circulation of the investment recommendation concerning the said issuer.

Breakdown of recommendations

At 17/01/2019, the recommendations issued by the Midcap research team at LOUIS CAPITAL MARKETS – MCP break down as follows:

Recommendation	Businesses tracked	of which "Corporate" businesses
Buy	73%	88%
Neutral	26%	12%
Sell	1%	0%

The reference prices used in this document are the closing prices. Any opinion given in this document reflects our current judgement and may be modified at any time without prior notice. LOUIS CAPITAL MARKETS - MCP has adopted effective administrative and organisational arrangements, including information barriers to prevent and avoid conflicts of interest in relation to investment recommendations. The remuneration of the financial analysts involved in drafting the recommendation is not tied to the corporate finance business. Past performance cannot be relied on as an indicator of future performance.

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