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Financial Statement of Italian Additive Manufacturing Firms

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Index

ABSTRACT

The present thesis work, part of the interdisciplinary research project: "The Adoption of Additive Manufacturing technologies: an analysis of the effects on value chain, firm organization and innovation strategies", has as its purpose the examination of the economic impact of Additive Manufacturing, colloquially known as 3D printing, for the main Italian companies involved in the new raising technology. It is divided into two parts: the first one is a literature review, which, obtained matching many articles or scientific publications, briefly explains what AM consists of, what are its variants and its applications, the advantages and disadvantages and, more generally, the aspects to be taken into consideration, focusing principally on those economic; the second one is a balance sheet data review, to evaluate in a more quantitative and tangible way the implications earlier introduced.

LITERATURE REVIEW

Overview of Additive Manufacturing

What is Additive Manufacturing

The technique leading the fourth industrial revolution or Industry 4.0 (the current trend of automation and data exchange in manufacturing technologies), is mostly known as Additive Manufacturing (AM), but also named 3D Printing (3DP) or Rapid Manufacturing (RM) or Digital Manufacturing or Direct Manufacturing or Rapid Prototyping (RP) or Layered Manufacturing (LM) or Solid Freeform Fabrication (SFF): it consists in the construction of an object layer by layer using a special printer machine and an appropriate material, following a 3D CAD model. There are various production method which are associated to this new increasing and disruptive technology, such as paste extrusion or the deposition of a binder on a powder layer.

More in details, variant Additive Manufacturing techniques are involved in the industry of manufacture; the differences depend on the raw material used, and on the agglomeration process (laser, light or liquid), hence it was finally divided into three main classes:

1. powder based process;
2. liquid based process;
3. solid based process.

The first one is run out hardening a powder by agglomeration, using a liquid binder to unify the powders together, or, rarely, a laser or electron beam to melt the powder. Primary ones are SLS (Selective Laser Sintering), where, controlled by a mirror, an UV ray takes a metal, polymeric or ceramic powder to its melting point, IJM (Ink-Jet Melting), where ink and a binder are sprayed on the powder to make it solidify and EBM (Electron Beam Melting), where an electron beam hits a metal powder causing its fusion.

The second process works a raw material in its liquid state, using a laser or a light source to solidify the liquid in order to obtain the final item. Principal ones are Stereolitography (SLA), where the UV ray solidify a photopolymeric resin in a tank and DLP (Digital Light Processing), where the only difference from the previous one is the usage of a non-actinic (i.e. free of electromagnetic radiations) light.

The third one is based on phase change materials. All these phase changes are influenced by external factors; the most important one is the temperature in the case of thermoplastic materials. Main ones are FDM (Fused Deposition Modelling), the largely adopted between all AM techniques, where a nozzle deposits a melted resin wire on a support structure (as it's observable in Fig 1) and LOM (Laminated Object Manufacturing), where a laser cuts thick layers of paper, plastic or metal foil to reach the desired shape.

In traditional manufacturing, it's widely known there is a high correlation between complexity and manufacturing cost, leading to a big number of restrictions on original designs in almost every project; all these are indicated as "Design for Manufacturing and Assembly" (DFMA). According to Hague (2003) the ability to build complex geometries objects with AM is the key point on the shift from Design for Manufacturing to Manufacture for Design, with the manufacture of a product

with a new and more complicated shape no longer limited by the constraint of mold making.

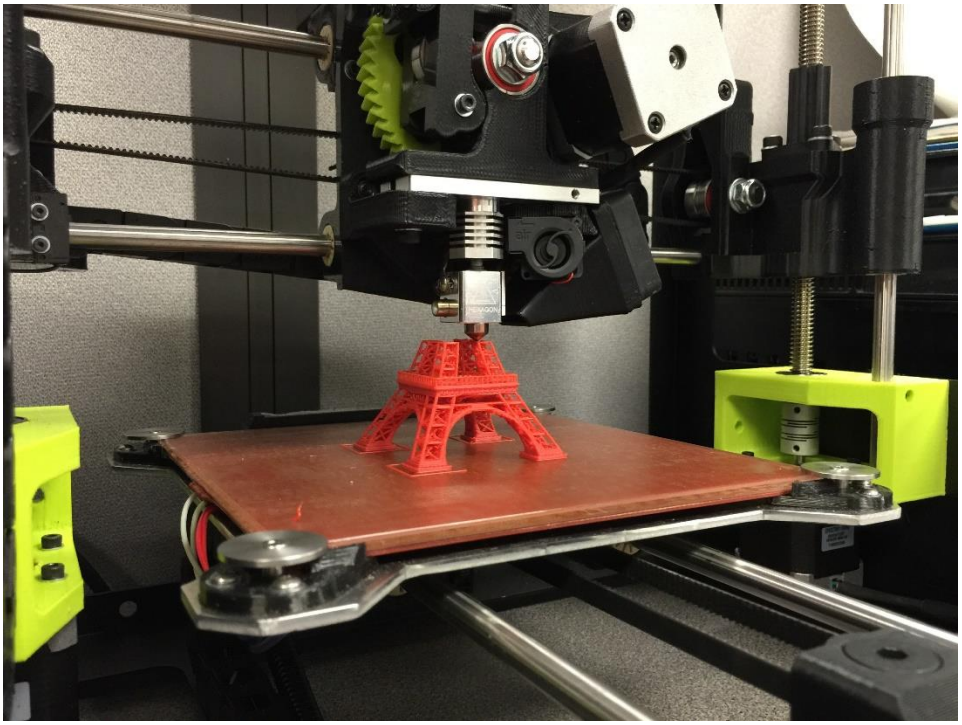


Fig. 1 A Tour Eiffel model obtained through FDM.

Advantages

Today 3DP offers clear advantages over current traditional alternatives, such as the possibility to create very complex shapes, with better aesthetics and functionality, including every types of movable part or objects inside the main ones or holes in the item making it lighter: geometric freedom is indeed possible thanks to the fact that no tooling, that usually "blocks" a design, is required; consequently, every geometric change, subtle or consistent, should be made without the need to incur the costs and times of producing new tooling, whereas, for injection moulding, the more is sophisticated the detail, the more is expensive the tool, and, moreover, some parts become, reaching a certain level complex, too complicated to produce with that "old" technology. The absence of tooling steps also permits to avoid other significant costs, like the direct tooling costs, tool changes and product development

process cost, which should solve any problem of cash flow for a company: it stated that most of the companies that fall into bankrupt risk suffer so due to cashflow problems. Additionally, all the lead times, set-up operations, changeover time and number of assemblies imposed by the presence of tool could be reduced or, also, totally removed thanks to 3DP (Tuck et al., 2007; Thiesse et al., 2015), simplifying the bills of materials at the same time.

The high grade of automation means that now the productive systems needs less workers than in the past just for few operations, with the possibility to move the site closer to the place where the items are requested (instead of, for instance, in a low-cost labor country). A curious example of this gain is represented by NASA's adoption of fused deposition modelling (FDM) to make the spare parts they need on the international space station yet; unlike older manufacturing processes such as machining, a complex product takes no longer and costs the same to fabricate than a simple one of similar size.

One more advantage to be considered is the lower amount of wastes compared to the traditional methods, thanks to the decreased mass of material needed (but with a larger choice of materials usable, Meisel et al., 2016) to be purchased, reducing the costs of disposal too.

Finally, the environment benefits from the stated decrease of the mass of materials and the reducing amount of energy consumed.

Future Additive Manufacturing processes will take more convenience over alternative processes in their capability to obtain structures and geometries that simply are not possible by other routes, with geometry freedoms described above as nearly example of this. The additive processes used by 3DP will allow production of increasing complexity parts and, probably, also with embedder electronics for monitoring or actuation purposes. The developments and motivations of such parts are hard to imagine and understand at this time, just because the possibility to manufacture in that ways has not been available in the past.

Disadvantages

One the other side, naturally, there are some disadvantages to not neglect.

The biggest barriers are represented by the high costs of purchasing both raw materials, due the little number of suppliers of a scarce range of printable materials

and their elevate negotiation power, and machines (but constantly in decrease with the rising of the technology; Attaran, 2017), whit machine patents being a relevant cause of exclusiveness (Niaki and Nonino, 2017); additionally, work and maintenance operations require important costs too (Waller and Fawcett, 2014). It's right to precise that also material purchase and maintenance costs are reducing with the growing of the market, but less than machine ones.

Probably the current limitation in material properties is explainable considering that, by the moment, they are not known sufficiently rather than they are simply not good enough for their purpose, plus the fact that toxicity of materials (Huang et al., 2013; Niaki and Nonino, 2017) and climate controlled environments for storage and production are further strong brakes (Meisel et al., 2016).

The inaccurate surface definition, because of layers thickness and STL files approximation, causes "Staircasing effect" or "Stair-stepping effect" (Drizo and Pegna, 2006; Petrovic et al., 2011; Berman, 2012; Bogers et al., 2016; Despeisse and Ford, 2015; Thompson et al., 2016), which requires post-processing refines to improve the quality of the products (Gao et al. 2015), is one more considerable obstacle. These are all aspects of AM that disadvantage the technique when compared with other manufacturing processes. As a result, these problems have led to a great amount of researches leading to significant improvements. However, in many aesthetic applications is still better to use the help offered by traditional approaches.

Applications

Nowadays, 3DP boasts applications in many industrial fields; main ones are (Guo and Leo, 2013; Mellor et al., 2014; Thompson et al., 2016; Attaran, 2017):

Automotive: manufacture of aerodynamic parts, wheels of every kind, suspensions, heat exchangers, sensors, keys and assembling systems;

Aerospace: manufacture of lighter components as brackets, jet engine fuel injection systems and air ducts for plane cabins, with consistent fuel savings and manufacture of drones;

Military: automotive and aerospace innovations used in the construction of military vehicles and manufacture of weapons;

Aftermarket: manufacture of spare parts of every kind;

Construction: Asserbo Mansion, in the outskirts of Copenhagen, was, first in its genre, built using a CNC machine with a drill as big as a room, unifying eight hundred and twenty plywood panels in only four weeks;

Architecture: production of scale models;

Electronics: manufacture and assembling of batteries and transistor and construction of embedded parts;

Jewelry: manufacture of jewels of every type;

Medical: manufacture of personalized prosthesis (from teeth to bones), surgical implants and replacement of tissues and organs (still in an embryonic phase);

Pharma: printing of, even customized, drugs (still in development);

Art;

Archaeology and palaeontology: possibility to replicate an old artifact or fossil now disappeared;

Food: printing of pasta, chocolate or candies in different shapes.

Main Actors

Today there are hundreds of 3DP producers all over the world, mostly located in U.S.A., Israel, Germany, United Kingdom, China and Japan. Fig. 2 shows the five most important ones and their market share between April and June 2017 (EOS is German, while the other four are American).

Q2 2017 rank	Company	General Material Type	Revenues from machines sold**	Q2 2017 global revenue share	Y/Y change
1	Stratasys	Polymer	$102.4M	30%	-7%
2	EOS	Metal & Polymer	$55.3M	16%	2%
3	GE Additive	Metal	$34.6M	10%	32%
4	3D Systems	Polymer & Metal	$26.9M	8%	-22%
5	HP	Polymer	$13.5M	4%	New

Fig. 2 The five most important producers in the world.

Cost Model

Introduction

Ruffo, Tuck and Hague (2006)'s cost model briefly presented below owns has been constructed with the purpose of assigning the full cost of a 3DP organization, enclosing all costs of plant and production, administration and necessary overheads.

In a contemporary manufacturing system, these last ones are increasing as manufacturers encourage the growth of automation and computerization, and thus, the distortion from traditional panorama is considerable (Brimson, 1991): the consequence is that a gradual change of cost models is necessary, and the main reasons are the following:

1. Traditional costing environment doesn't provide non-financial information, elemental for manager's decision making;
2. Product costing is inaccurate;
3. Costing systems should promote improvements;
4. Today overhead costs are much consistent than labor ones.

This last point, more than the others, is important for automated technologies introduced in modern industrial processes, because of the changes due to the continuous increase of automation and decrease of manual labor in manufacturing processes changes the product cost.

Allocation base for costs

The direct cost of the machine's purchase and all indirect costs are split to each individual product considering the time taken by the machine to make them. Machine warming-up, set-up, cleaning, and cooling down phases imply times in which it is not fabricating layers and these fixed times (equivalent to fixed costs) must be taken into account for cost allocation.

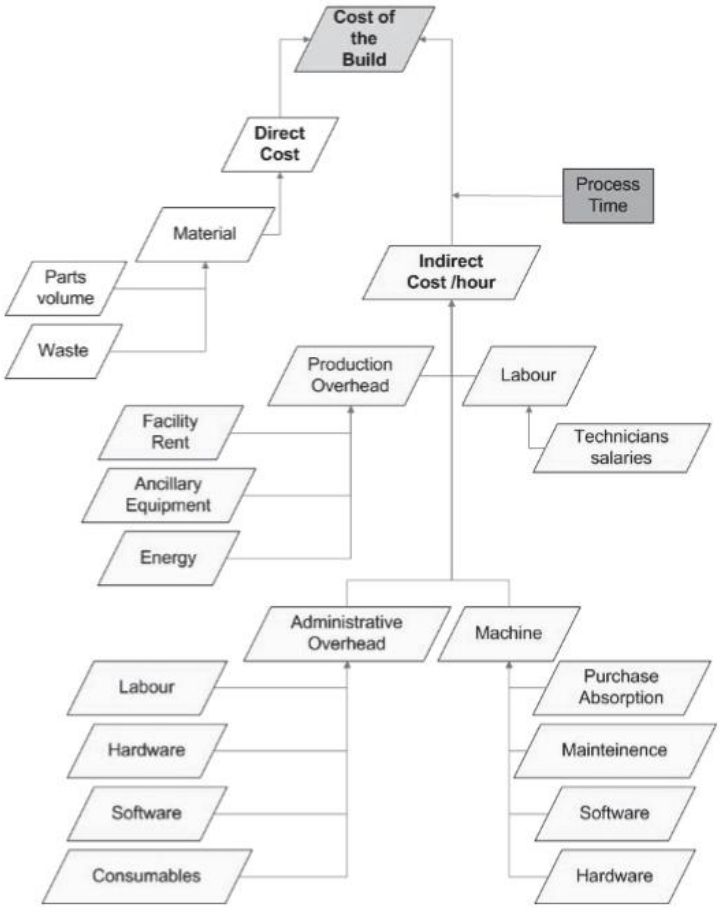


Fig. 3 The costing model scheme.

The total item cost ($Cost_B$) is the sum of the direct cost related with the use of material during manufacturing process (m_B) and the indirect cost related with the previously explained time of building (t_B)

$$Cost(m_B) = Cost(t_B) + Cost(m_B) \quad (1)$$

Where

$$Cost(m_B) = \frac{direct\_Cost}{mass\_unit} m_B \quad (2)$$

$$Cost(t_B) = \frac{\sum indirect\_Cost}{working\_time} t_B \quad (3)$$

The material and time spent in the building process (m_B and t_B respectively) are the principal variables of that model: part mass (or volume) refers to the amount of raw material used, whereas time indicates how long the machine works during production operations.

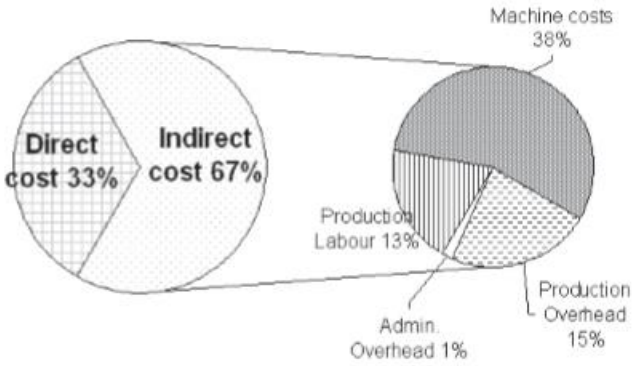


Fig. 4 Pie charts showing the impact of the general activities over the total cost. Example of a lever in high volume production of 16,000 parts, having a cost per part of 3.25 €.

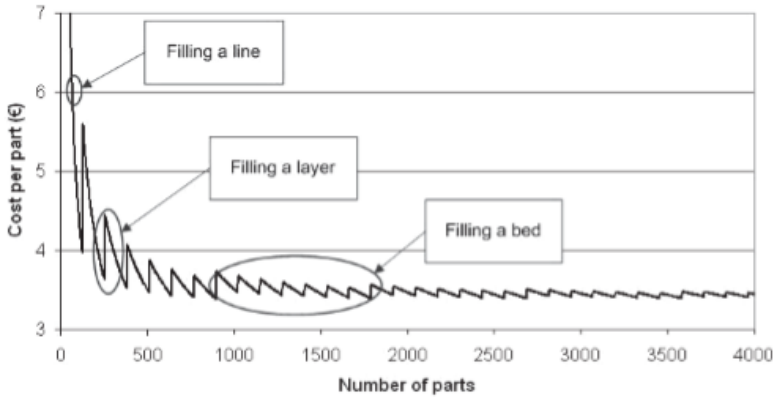


Fig. 5 The curve indicates the cost per part changing with the production rate.

With regard to mass and time, further insights will not be carried out in order not to stray too far from the financial purposes of this work.

Business Model

Strategic drivers

Technology and innovation for an enterprise focusing on the development of manufacturing are key ways to obtain or enhance a competitive and sustainable advantage.

Innovation performance index, ranking the amount of new items developed, is influenced by both internal and external actors. The first ones could be summed up to the research projects the company decides to look into; hence, the most important thing is to choose the right ones, in order to start a successful business. On the other side, external actors are represented by technological opportunities and conditions of property; but the most important factor is, obviously, the demand, because the final aim of every firm of every business is the satisfaction of the customers.

Considering the SMEs (small and medium enterprises) context, AM and 3DP make possible the exploitation, instead of the economies of scale, of the economies of scope. Indeed, the main aspect of strength of this new technique is the easy and rapid alignment to the chosen market and, from here, to the company's current businesses, production centers and R&D strategy. It's widely known that these firms involved in the world of Additive Manufacturing are characterized by little quantities and significant degree of customization, bringing to the nascent paradigm of personalization, which takes firms, now more than in the past, to follow a product differentiation strategy, when in the past the focus was on volumes. These changes due to mass customization conduct to the further concept of modularity, stating that various matching of modules lead to that variety. Today, the introduction of AM is creating that new personalization's manufacturing paradigm, as it is introduced above, where products are based on individual needs and desires of customers; this means that products are frequently designed (and so produced) to satisfy a specific and individual requirement.

Furthermore, specialized customer-specific products allow to the inventoried components can be produced based on lean principles and Kanban signals to replenish the more standardized components and the customized products are manufactured just in time based on the AM technologies. This setup is reducing complexity in the supply chain (balancing capacity and inventory), decreases the

response time, and changes the business model as such, as in line with the mass customization approach (Da Silveira et al., 2001; Pine, 1999; Tseng and Piller, 2003).

How to become a "Smart Factory"

First of all it is important to highlight that every company, based on its specific situation, its objectives and potential, must develop an ad hoc path in the transition to Industry 4.0. Below there are the steps common to all companies to reach at least a first level of the so called "Smart Factory": fast, proactive, flexible, paperless, digital and optimized:

1. Automate the production process;
2. Connect machines and systems together;
3. Collect, integrate and transfer information between people, materials, machines and the central control system in real time;
4. Equip operators of devices connected to the web to manage production activities.

MES Systems (Manufacturing Execution System) are software that, within a firm, are ideally placed between ERP management systems and SCADA/PLC machines and gather strategic information to help the management to understand how the current conditions of productive plants can be optimized to improve production. MES systems can operate on several fronts, such as order progress, production planning and scheduling, real-time monitoring, traceability, maintenance. In this regard it is important to point out that not all MES on the market are the same, MESA (Manufacturing Enterprise Solutions Association) has identified a standard model of functionality but over the years the different manufacturers have differentiated their offer by adding new features and using different development technologies.

Industry 4.0 brings to the factory the latest technological innovations such as cyber-physics systems, wireless communication, the Internet of things, digitalization, 3D printing, robotics and advanced sensors. MES systems are

preparatory software for the implementation of these technologies: for example, that interconnected sensors could be joined along a production line and are probably able to collect some process data and communicate with each other, but not to replenish useful information about the evolution of the production: the data to be relevant must be "intelligent": it must originate from in-depth and cross-analysis and the tool responsible for doing this is an MES system, the only one capable of enhancing data (thanks to inter-functional algorithms) and to provide managers with the information they need to make the right decisions at the right time.

MES systems translate the collected data and give it meaning by allowing a precise knowledge of what happens in the factory in real time: thanks to these systems it is possible not only to react immediately to possible production drifts but also to implement actions to optimize and reconfigure production processes to bring the factory to maximum efficiency.

The MES does not limit itself to collecting data in real time but it is a proactive system, i.e. it allows to receive and send signals to the machines triggering certain actions in the presence of pre-established events. In this way, the system promptly warns the managers in case of deviations from the process or deviations from the expected performances. With a MES system the factory becomes transparent, all processes are integrated, measurable and under control.

How the countries promote the transformation in Smart Factories, the specific case of Italy

The national plan “Industry 4.0” was presented on September 21, 2016 in Milan by former council president Matteo Renzi by the Minister of Economic Development Carlo Calenda and was included in the Law of Stability 2017.

The government's program aims to boost private investment in technologies and assets I4.0, increasing private spending in research, development, innovation, venture capital and start-up to facilitate its growth. To facilitate these investments, starting from January 1, 2017 there are important tax incentives (not to "ban" but activated by each company) distributed in seven years from 2018 to 2024 for the coverage of investments incurred in 2017. Italy therefore with this initiative launches a message of support to companies and aligns itself with similar projects already launched in Germany, the United States and France in favor of Industry 4.0.

In order to benefit from the incentives provided by the 2017 Stability Act, companies must invest in technologies to support transformation 4.0. Indeed, the law provides for a list of ' enabling ' technologies that benefit from tax incentives and which can substantially be distinguished in ' material ' and ' intangible ' goods. Here are some examples: material goods consist of instruments and machinery equipped with sensors/drives that allow interconnection and computerized controls such as:

Robots, collaborative robots and multi-robot systems;

Warehouses interconnected to factory management systems;

In-process monitoring systems to ensure and trace the quality of the product and/or the production process;

Systems for the inspection and characterization of materials;

Devices Intelligent for the testing of metal powders and continuous monitoring systems that allow to qualify the production processes by means of additive technologies;

Instruments and devices for the labelling, identification or automatic marking of products;

Equipment for man-machine interaction and for improving ergonomics and workplace safety.

Intangible assets are software that allow to manage and digitalize the processes:

Software, systems, platforms and applications for the production of artifacts in not-conventional or high performance materials, able to allow the design, 3D modeling, simulation, prototyping;

Software, systems, platforms and decision support applications capable of interpreting data analyzed by the field and then showing online operators specific actions to improve the quality of product and efficiency of the production chain;

Software, systems, platforms and applications for the management and coordination of production with high characteristics of integration of service activities, such as logistics and maintenance;

Software, systems, platforms and applications for quality management at the production system level and related processes.

Since 1st January 2017, companies are able to enjoy a 250% depreciation on the purchase of material goods functional to the technological and digital transformation and a depreciation of 140% on the purchase of intangible assets related to tangible investment in "Industry 4.0". This benefits may be enjoyed until 30 June 2018, provided that such investments in tangible/intangible assets refer to orders accepted by the supplier by 31st December 2017 and that, by the same date, the payment of advances is not less than 20% of the total.

Glocalization: local vs global production

Talking about 3DP's economic landscape, is important to present the "glocalization" (this term combines globalization and localization) vision, focused on the coexistence between the global and the local to reach the optimization of companies' business activities (Svensson, 2001); this approach needs a self-sufficient supply chain, to allow the factories to provide materials, pre-assembled elements, and parts in general for local suppliers to satisfy local customers' desires. The global aspect appears when this model is shared in diverse areas around the

world, with suppliers and regional partners operating with the aim of making it responsive and flexible.

Separating the various regions and stipulating alliances with these local partners and customers is so an important part of that new business model, which is constantly growing; localization could also be implemented in a market focus, because the manufacturers will be able to tailor products to their specific markets.

In addition, companies are now paying more attention to reduce inventories and costs of transport. In particular, AM will allow companies to enhance their delayed differentiation and, in the meanwhile, generally decrease inventory levels, fitting better the supply to clients' demand, and, in the meanwhile, spending much less effort in forecasting operations. Centralized inventory and AM production for just a low number of components will decrease stored items, keeping investments lower. This signifies that the enterprise may have only the more used parts on its inventory shelves with a much higher turnover.

In a decentralized structure, with several brands around the world, the manufacturing of a few remaining scale parts moves closer to the consumers: the producer will be so able to reduce the inventory levels in the distribution centers near to the local markets and increase its responsiveness simultaneously.

Moreover, this process also encourages the establishment of the "glocalized" supply chain.

Mass market and how firms are changing

These changes are leading to a new business model based on a decentralized supply chain, whit a movement to the manufacturer–consumer decoupling point, where the latter takes over some production steps of the former.

Cotteleer and Joyce's method (2014) shows four different paths related to two fundamental transformations:

A companies take advantage of the lower minimum efficient scale for additive manufacturing. This affects the supply chain;

B companies take advantage of the versatility in producing different products. This affects the final products.

Matching these changes, there are so four possible combinations:

1. Statis: firms explore AM to improve value delivery for current products with existing supply chains;
2. Supply chain evolution: firms take advantage of the lower minimum efficient scale to change the supply chain in better (example of Meisel et al. in 2016, who showed how additive manufacturing permits a change in the location of manufacturing, i.e. closer to the customer);
3. Product evolution: firms take advantage of the higher flexibility to reach new performance or innovation levels for items they produce;
4. Business model evolution: firms change both supply chains and products in the pursuit of running a new, more modern and successful, business model.

Product change	High	Product evolution	Business model evolution
	Low	Stasis	Supply chain evolution
		Low	High
		Supply chain change	

Fig. 6 The four types of enterprise in Cotteleer and Joyce's method.

Toffler (1980) suggested that the formula "prosumers" (producer + consumer) is increasing in importance in the digital era, where consumers, supported by the diffusion of the Internet (Rennie, 2007) are producers of very personalized content, replacing, as it's said before, the centralized structure.

“Homemade” personalization of the product

Because the prices of a “personal” 3D printer are hugely falling down, and that situation will persist in the next years, is probable that a large amount of consumers will own a personal 3D printer as the technique jumps into the mass market (Wohlers, 2014).

An online platform, thought for consumers who create their own designs, with the possibility to share them with others, with manufacturers satisfying their printing needs, could bring to a new important scientific community, whose results will be kept or slightly modified like in the best Open Innovation situation (cf. Jeppesen and Frederiksen, 2006; Lakhani and von Hippel, 2003). This could also possibly be used to monitor trends in the industry, ranging from design to purchasing behaviour, and it can also be used to generate and establish a co-creation platform (Sawhney et al., 2005; von Hippel, 2005).

On the other hand, if a firm would like to keep control of the designs that its consumers contributed to, it has to augment the number of parts and, thereby, the supply chain complexity too. In a total decentralized system, like the one presented is, it’s counterproductive to manage such a large variance. There is so a trade-off between the amount of differentiation and its convenience.

It’s right to state that, with the growth of individualization, a company as to approve every new object’s for safety and mechanical behaviour, and these relationship changes at the decoupling point between the two actors, have legal implications, depending on what level of control the manufacturer wants to keep on the other-designed files.

Considering that traditional manufactures are still largely used, the new AM business models should be complementary and co-existing with the previous one (Benson-Rea et al., 2013), with the main products following the traditional system, and the personalized ones being on top of that.

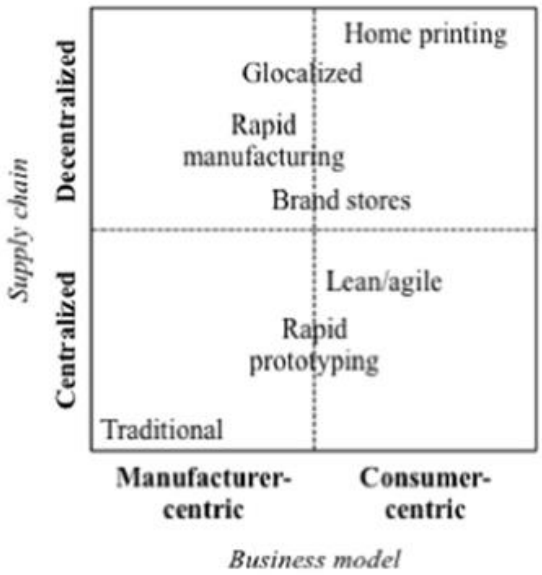


Fig. 7 includes the supply chain dimension in a proposed framework for AM-based manufacturing solutions.

Some examples of personalization

One of the most famous examples of the new described business model is the online printing service 3D Hubs, in which everybody who own a 3D printer can offer their services to others for a fee. On June 2016, there were about 30,500 printers all over the world connected through 3D Hubs, and most of these weren't professional industrial machines, but just consumer-level 3D printers. This is emblematic of how and how much manufacturing is moving from big factories to small houses. That situation brings back to the times before industrial revolution, with non-professional workers using simple equipment they bought from their own to fulfil in their labours the contracts stipulated.

Another important example of a completely different model of work organization is the one of Local Motors, a company based in Arizona that offers customizable cars using AM. The biggest change from 'traditional' car manufacturing is that it uses free online labour to support its R&D activities, avoiding the huge R&D costs the most important and traditional car makers in the world have to suffer (Anderson, 2012). While GM's Volt (an hybrid car launched

through its famous brand Chevrolet in 2010) took six years and $6.5 billion spent in research activities, the Tesla Roadster (an electric car on the market between 2008 and 2012) six years too and "only" $250 million, the Local Motors Rally Fighter (the first car to be developed using co-creation design, starting from 2007) took only 18 months and cost the ridiculous sum of $3 million to develop (Anderson, 2012). Local Motors also involves as much as possible clients in the final assembly of their customized car, making at least 50% of the car. The assemblage is performed at 20-workers micro-factories of which one is even mobile, representing around 1/110th of the capital of "regular" car plants (Anderson, 2012).

The problem here is that, if people's intellectual property is not protected, then there isn't a large incentive to be innovative and improve things, because every gain can easily be "stolen" by other users: scanning equipment can be used to digitalize real objects into files to print perfect copies (Depoorter 2014; Bechtold, 2015; Xin and Xiang, 2015).This is tangible in many types of industries as well as the sales of consumer goods and spare parts of every kind.

Another point regarding IP protection is that people obviously dislike that their creative works may be used by others consumers. A short but emphatic example is the one of a controversy that arose in the U.S. in February 2016, when an AM innovator found out that her creations were offered for sale by an eBay re-seller who had grossly downloaded thousands of 3D models from Thingiverse (one of the main websites offering free 3D printing files) and listed these copies of those models for sale on eBay without acknowledgement of the artists' hard work (Koslow, 2016). Although these files can be downloaded without paying any fee, they typically carry a "Creative Common Attribution Non-Commercial License", which strongly declares that anyone is free to download, modify, duplicate or print the model freely, but it's strictly prohibited to use it for economic (Grunewald, 2016). In this case, the re-seller ended up removing all items from this site.

One more example is the very complex legal case is that of additively manufacturing guns and drugs which is still affecting both the United States and, particularly, Australia (Molitch-Hou, 2015). Indeed, in the next 20 years we will be able to print at an atomic level, possibly at home, substances like metals or drugs: Pennsylvania-based Aprecia Pharmaceuticals is producing 3D-printed Spritam (levetiracetam), tablets useful to treat epilepsy. Regulation of these things is still thought considering that making them typically required high experience and specialized equipment, but that situation may not last for long: this means that in the

next future we need a new global approach to legislation that specifically regulates the capabilities of 3D printers, and the distribution of the files they use.

New South Wales, Australia, is the only state that has started outlawing the digital blueprints needed for AM of illegal objects; however, we need a precise classification of these files. Australian Classification is already responsible for passing judgement on a wide array of media: in the future we will likely see such an agency extended to cover digital blueprints available or for sale to the public.

"While 3D printers will inspire the creativity of producers and reduce costs for consumers, they will also make it far easier to infringe patents, copyrights, and trade dress. This will compel firms to rethink their business practices and courts to reconsider not only patent law but also long-established doctrine in areas ranging from copyright merger to trademark post-sale confusion" (Desai and Magliocca, 2014). These are matters with an uneasy solution, because they require a rethinking of current laws, and have already led to specific deals to face the complexities inherent in additive manufacturing (Grunewald, 2016).

Advantages and risks for incumbents

Regarding the previous concepts, a sustainable advantage is obtain if customers prefer a brand's product over the majority of the others; the new business model may offer such a competitive advantage, augmenting the value created through the traditional one in the name of a differentiation strategy, with customers assigning more value to these technologies. Hence the final purpose is to become recognized by the corresponding clients as different. In doing so, they will choose that companies objects instead of the competitors' ones. It's evident that AM drives companies to get a competitive advantage, regarding mostly factors like process innovation, costs, consumers' value, incomes, profits, sustainability of the competitive advantage.

Nevertheless, incumbents mustn't ignore its potential to cannibalize the traditional technologies (Christensen, 1997; Tushman and Anderson, 1986). This is very important for the ones whose capabilities are becoming obsolete in this competence-destroying process of innovation (Tushman and Anderson, 1986; Henderson and Clark, 1990; Hill and Rothaermel, 2003). Indeed, the same

capabilities that are elemental for the old business model may become rigidities that slow performance while swapping in the new model (Chesbrough, 2010; Leonard-Barton, 1992).

Using this last one, with the consumer's position now more emphasized, the manufacturer can create a lock-in effect, as many of its customer would like to use the service again, creating value for both users and consumers.

BALANCE SHEET DATA ANALYSIS

Introduction

As introduced in the abstract, the present work consists in an economic and financial analysis of some Italian firms involved in Additive Manufacturing activities; these four pages fully explain how the data were collected and all the aspects related to this step. Subsequently, in the next sub-chapters, the study of the graphics will take place.

The site used to catch the balance sheet data was Bureau van Dijk Electronic Publishing, a major international publisher of business information, specialized in private companies and combined with a specific software for searching and analyzing their data. It's a Moody's Analytics company.

Originally, the enterprises, the foundations and institutions were found out in the work of a former student, and were divided into producers, users, re-sellers and others yet. Not all of these were available in BvD database and, moreover, was necessary to discard to ones having the following three problems:

1. Companies too big to think that AM could have an important impact, now or in the next future, in the case of FCA and Olivetti;
2. Companies too small (annual revenue under €1 million) to run an accurate and stable analysis over them;
3. Companies with just a few years of balance sheet data recorded (six or less) for a precise study of the recent trends, most frequent case.

After the online researches, the companies reached the number, from a beginning point of seventy-seven, of only twenty-two and, according to the teachers, their categories were slightly changed in producers, users, re-sellers (like before) and AM experts (with the members of that last category indicated by the teachers themselves); this changing was carried out because for the first three groups is difficult to establish the real amount of 3DP activities in their business and the year of adoption (and the intention was to not disturb them asking that, in prevision of the future survey), whereas for the last one, although the real amount is not certain, it is really high, and that makes the analysis more significative.

Using the grouping function offered by the site, all these companies were matched with their closest competitors in order to make a useful comparison; the algorithm used to pursue this issue was this one: the ten closest enterprises in terms of revenues from sales, sharing at least the first three characters of their ATECO code (a sequence of six numbers identifying the various sub-types of activity); sometimes, not all the balances of the firms were available, that's the reason why some companies are compared to ten equivalents, and other ones just to seven or eight.

The budget items recorded for each firm (involved in AM or just competitor) were the following:

Balance Sheet Assets:
Fixed assets
Intangible fixed assets
Tangible fixed assets
Current assets
Stocks
Receivables
Financial
Liquids
Cash & Cash
Total assets

Balance Sheet Liabilities and Net Equity:
Shareholder funds
Shareholder funds: capital
Non current liabilities
Non current liabilities: long term debt
Other non-current liabilities
Current liabilities
Current Liabilities: loans
Current Liabilities: creditors
Other current liabilities
Total shareh. funds & liab.
Working capital

Net current assets
Enterprise value

Income Statement 1:
Value of production
Sales
Cost of materials
Gross profit
Other operating expenses
Operating P/L
Financial revenues
Financial expenses
Profit and loss on foreign changes
Financial P/L
Adjustments to the carrying value of financial assets
Extr. and other revenue
Extr. and other expenses
Extr. and other P/L
Profit (loss) before tax
Taxation
P/L after tax

Income Statement 2:
Cost of employees
Depreciation
Interests
Cash flow
Added value
EBIT
EBITDA
Employees

Indexes:
ROE
ROI

ROA
Profit margin
Gross margin
EBITDA Margin
EBIT Margin
Stock turnover (days)
Current ratio
Liquidity ratio
Solvency ratio

In particular, underlined elements are the ones on which two types of graphics were build: indeed, to evidence if there were background conditions which allowed the adoption of the technique or consequences after the installation of it, two types of graphics of the main budget items were constructed using the data previously downloaded:

the first ones, very simple, consist in XY dispersion line graphics, useful to easily report the order of magnitude and the last tendencies of each firm along the years;

the second ones, more complicated, consist in histograms showing the percentile variations of these items in the three-year periods 2007-10, 2010-13 and 2013-16, using the formula

$$\frac{V(t+3)-V(t)}{V(t)}$$

unfortunately, especially for Employees, ROE, ROA, ROI and Stock Turnover, sometimes previous years information were not available: that's the reason why some columns have only one or two periods of information with just one or two colours instead of three.

It's the case to say, moreover, that in many cases some values were too far from the AM enterprise ones, so they were cut off because useless, and to permit a better graphic lecture.

Producers

Sisma S.p.A.

Presentation

Established in Schio (Vicenza) in 1961, Sisma is an Italian reference for the design and production of extremely high precision machinery: more in details, it creates customized machines for metal's moulding, including special parts and accessories, but not interchangeable parts, according to its 284100 ATECO code.

The company has a quality management system that complies with ISO 9001 international standards.

Innovative by vocation, Sisma's activities comprehend also consultancy, technical assistance and training service.

The sector

According to and Plimsoll (a specialized site for sectoral studies) and UCIMU (association of Italian machine tool manufacturers, robots, automation and products to these auxiliaries), this sector in Italy is knowing a slow growth, although a worldwide lightly decrease in the last year: the majority of its companies has augmented its revenues in the last exercise.

Peer	
Name	284 VL (Very large companies)
Description	Manufacture of machine tools for metal forming of other machine tools
Size	213 companies

Competitors

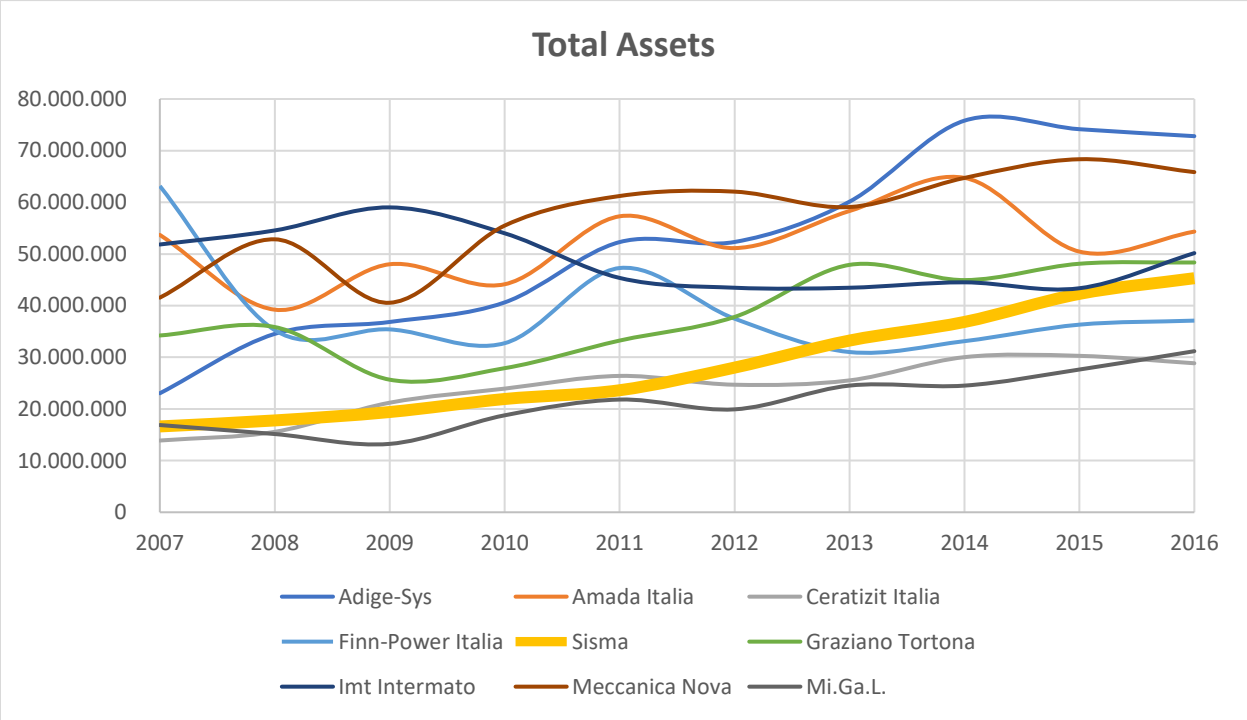
Companies	ATECO code	Description
Adige-Sys	284100	Manufacturing of precision mechanical equipment and trade in industrial, building and precision mechanical machinery
Amada Italia	284909	Manufacture of other machine tools (including parts and accessories) n.e.c.
Ceratizit Italia	284000	Manufacture of machine tools for metal forming of other machine tools
Finn-Power Italia	284000	Manufacture of machine tools for metal forming of other machine tools
Sisma	**284100**	**Manufacturing of precision mechanical equipment and trade in industrial, building and precision mechanical machinery**
Graziano Tortona	284000	Manufacture of machine tools for metal forming of other machine tools
Imt Intermato	284909	Manufacture of other machine tools (including parts and accessories) n.e.c.
Meccanica Nova	284000	Manufacture of machine tools for metal forming of other machine tools
Mi.Ga.L.	284100	Manufacturing of precision mechanical equipment and trade in industrial, building and precision mechanical machinery
Sacma Limbiate	284000	Manufacture of machine tools for metal forming of other machine tools

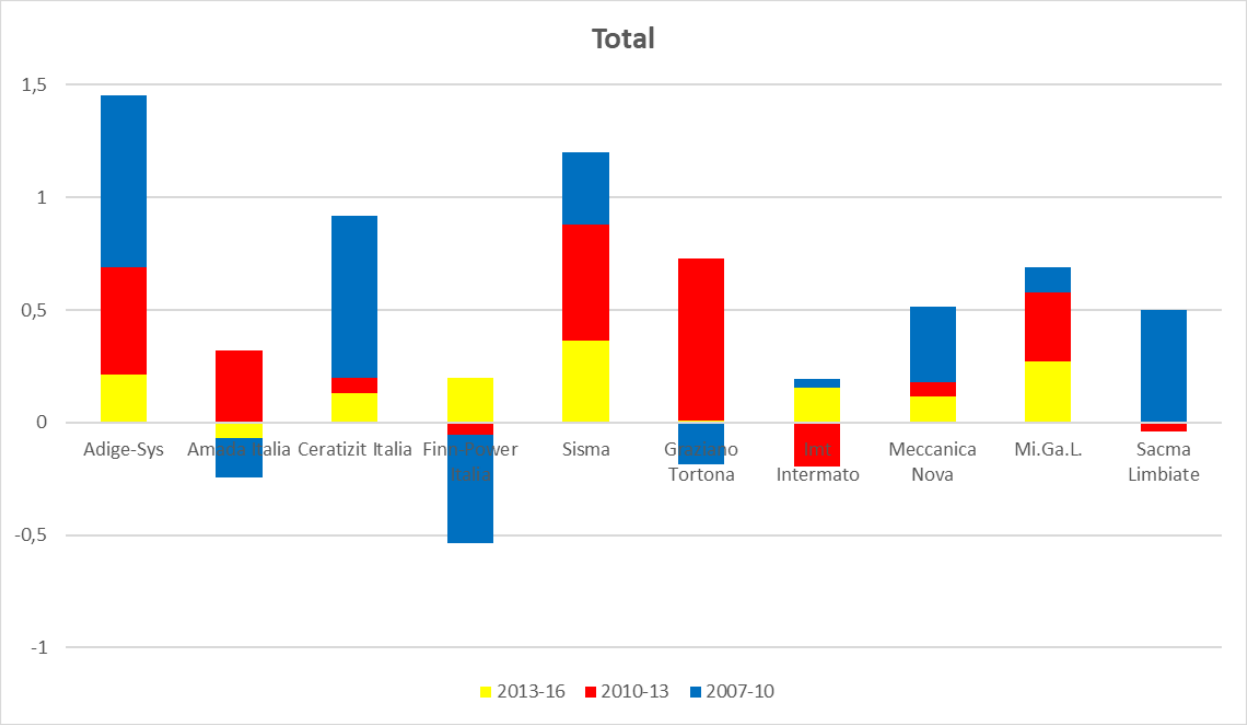
General Comments

The total assets in 2007, the starting year of the analysis, are much lower than sector's average but, after a strong and stable increase, they reached the mean value in the last exercise; moreover, in a slightly variable landscape, Sisma is, with a few competitors, the unique company with a net growth in all the three years period and the steadier increasing one.

In particular, fixed assets have almost tripled in the last then years, whereas current ones have "just" doubled. Tangible assets are augmenting and intangible ones are actually reducing, so Sisma is entrust for the future to physical goods more than licenses or patents. Stock are growing faster than the others, but remain smaller

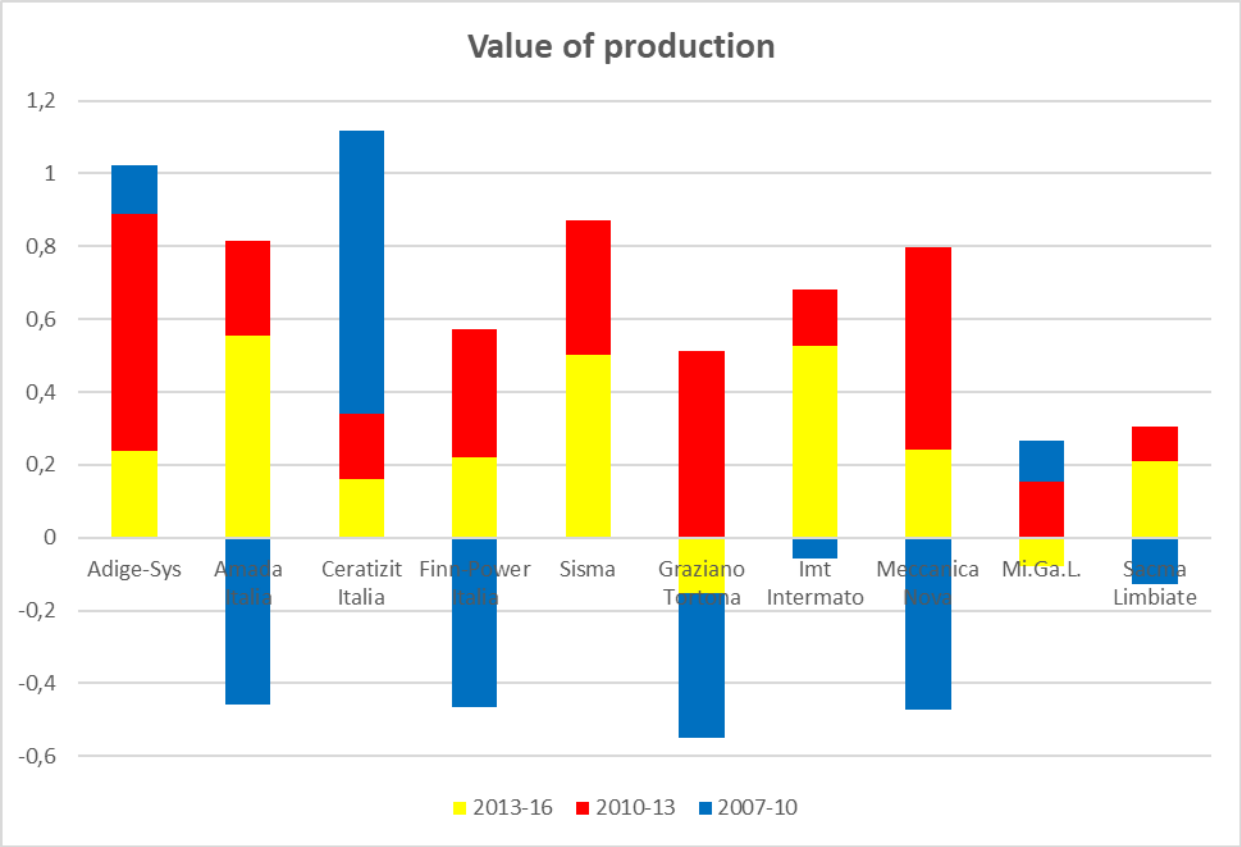
than the rest of the group. The enterprise has a high amount of receivables but not liquidity problems: for that item is one of the best in the peer.



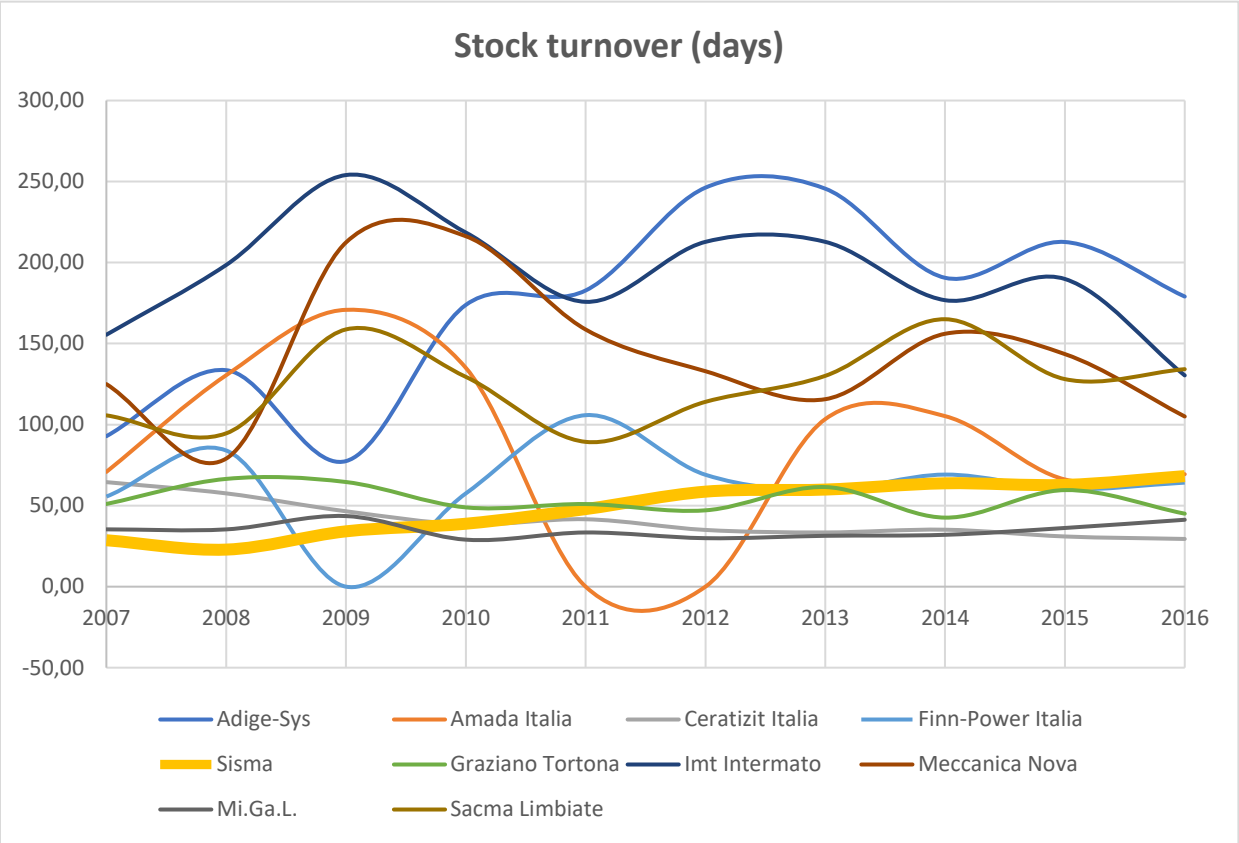


Shareholder funds are incrementing, with a peak of €25 million in 2016, thanks to reserves and earnings, because the capital is always stuck at €1.04 million. The amount of current liabilities is in average three times bigger than non-current one: Sisma as preferred this funding strategy in the last decade. Comparing to the other subjects of the peer, the company boasts more stable and low data.

Regarding the Income Statement, value of production is growing slightly more than the rest of the companies and has passed from less than €20 million in 2009 to constant €50 million in the last years; added value follows the same paths, with the last values reaching around €15 million. Cost of material are growing as the former two items, while cost of employees and their number are augment, in this case, more than the remaining firms; depreciations are not so considerable and always under €1 million. Final results are good, with operating P/L and P/L after taxes always positive, higher and much more steady than other similar companies in a very variable panorama.



The indexes are very good too: ROE, ROI and ROA are always positive, much higher than average and without the fluctuations the rest of the group has; both gross margin and profit margin have the same trend. Stock turnover is much lower than the medium value, this means that, considering the good result of the brand too, Sisma's productive and seller chain is better organized than the rest of the sector.



To conclude, the company has positive and stable results that put it in an advantage position in the field of metal moulding, allowing the exploration of AM technique in order to gain one more competitive advantage.

Omera S.r.L.

Presentation

Based in Schio (Vicenza), Omera designs and manufactures hydraulic and mechanical presses, trimming-beading machines, automatic production lines, T-shears and punching machines. Since 1951 it has pursued a development process with the aim to be one of the international reference marks in the field of sheet metal processing machinery and equipment. Among the many reasons for its success is the attention to the internal growth of technical culture and the interest to follow the technological evolution in hydraulics, mechanics, electronics and components.

The sector

The sector is the same previously introduced (ATECO code 284000).

Peer	
Name	284 VL (Very large companies)
Description	Manufacture of machine tools for metal forming of other machine tools
Size	213 companies

Competitors

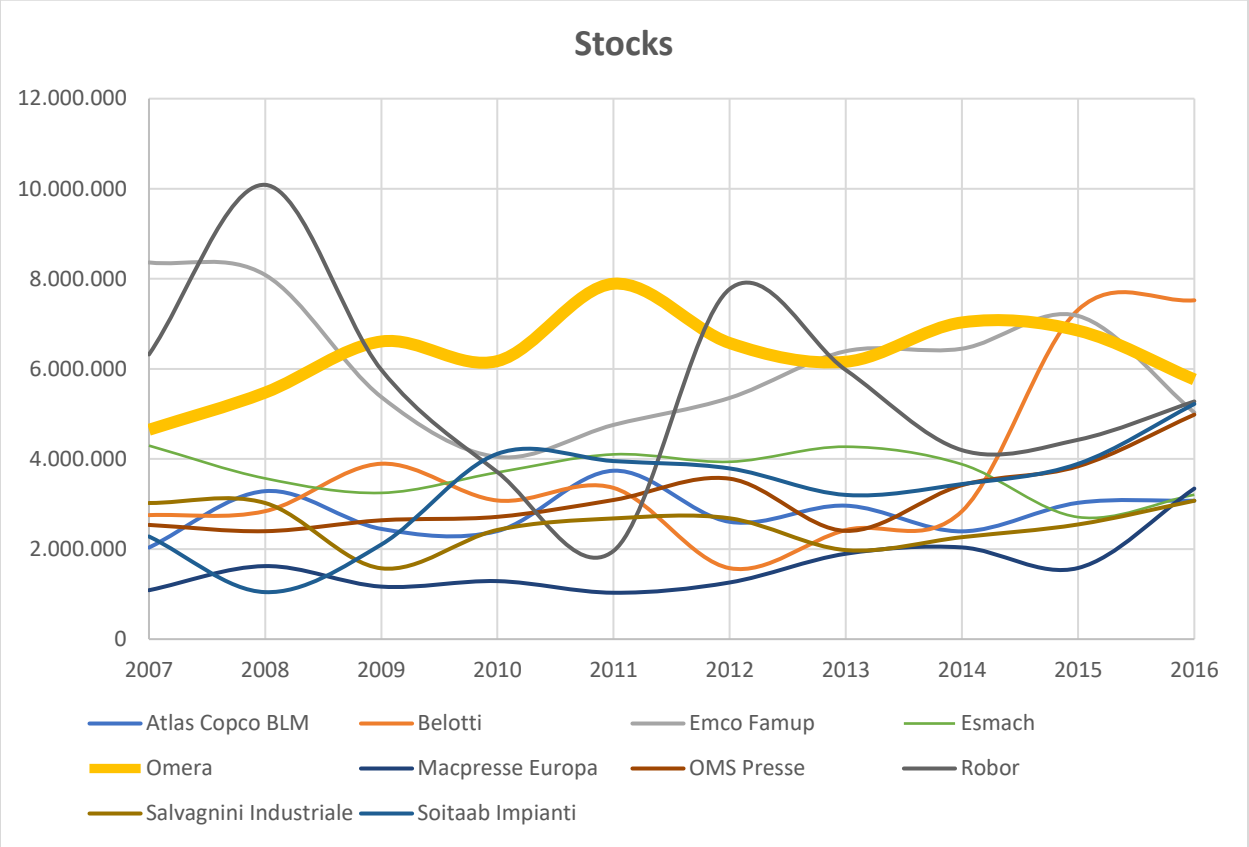
The competitors are different because the two firms are distant in terms of value of production in the last year (€18 million for Omera and €50 million for Sisma).

Companies	ATECO code	Description
Atlas Copco BLM	284909	Manufacture of other machine tools (including parts and accessories) n.e.c.
Belotti	284000	Manufacture of machine tools for metal forming of other machine tools
Emco Famup	284100	Manufacturing of precision mechanical equipment and trade in industrial, building and precision mechanical machinery
Esmach	284000	Manufacture of machine tools for metal forming of other machine tools
Gimeco Impianti	284100	Manufacturing of precision mechanical equipment and trade in industrial, building and precision mechanical machinery
Omera	**284100**	**Manufacturing of precision mechanical equipment and trade in industrial, building and precision mechanical machinery**
Macpresse Europa	284000	Manufacture of machine tools for metal forming of other machine tools
OMS Presse	284100	Manufacturing of precision mechanical equipment and trade in industrial, building and precision mechanical machinery
Robor	284909	Manufacture of other machine tools (including parts and accessories) n.e.c.
Salvagnini Industriale	284000	Manufacture of machine tools for metal forming of other machine tools
Soitaab Impianti	284909	Manufacture of other machine tools (including parts and accessories) n.e.c.

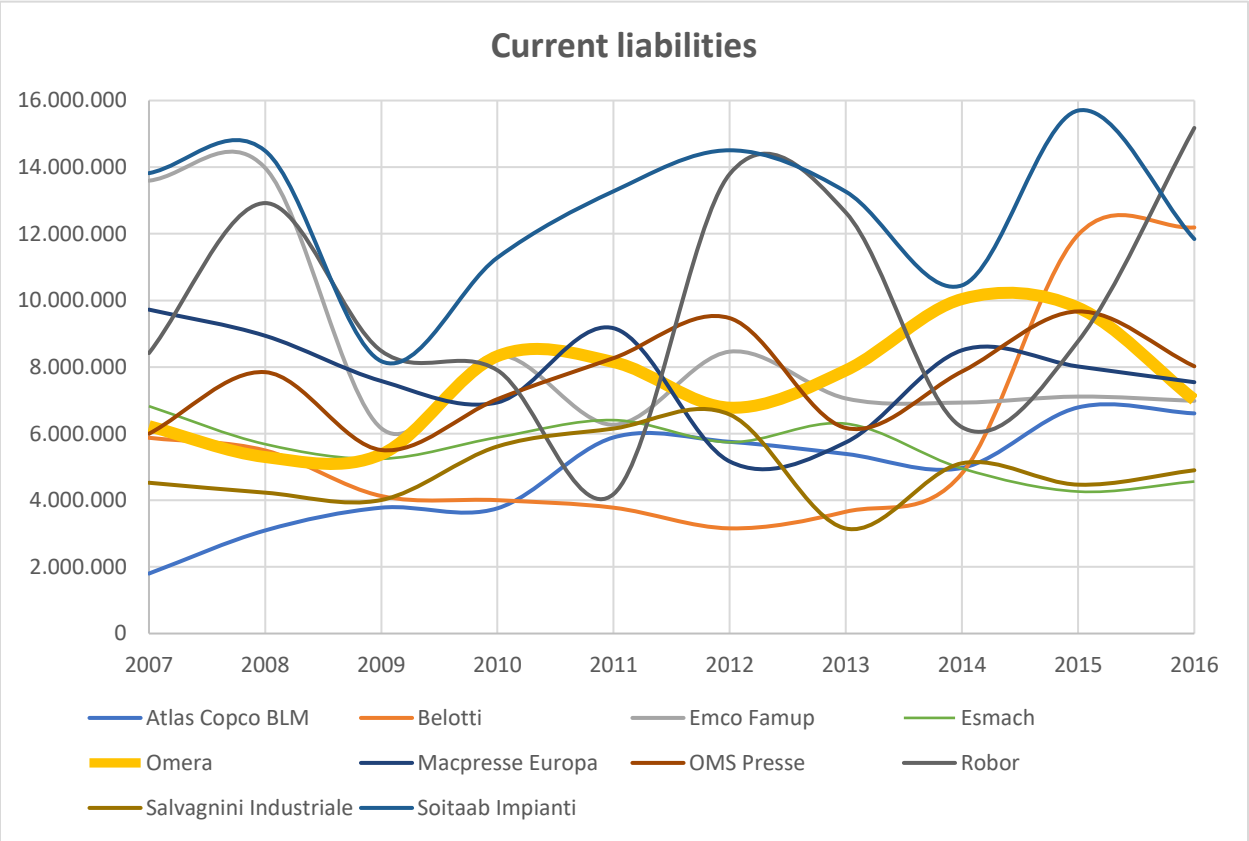
General Comments

Fixed assets are, for the whole period taken in exam, steady and higher than average: more in details, fixed ones are always the highest of the peer and now in little decrease, whereas current ones fluctuate around the mean value. Stocks are almost always more consistent than the majority of the group, with a duplication

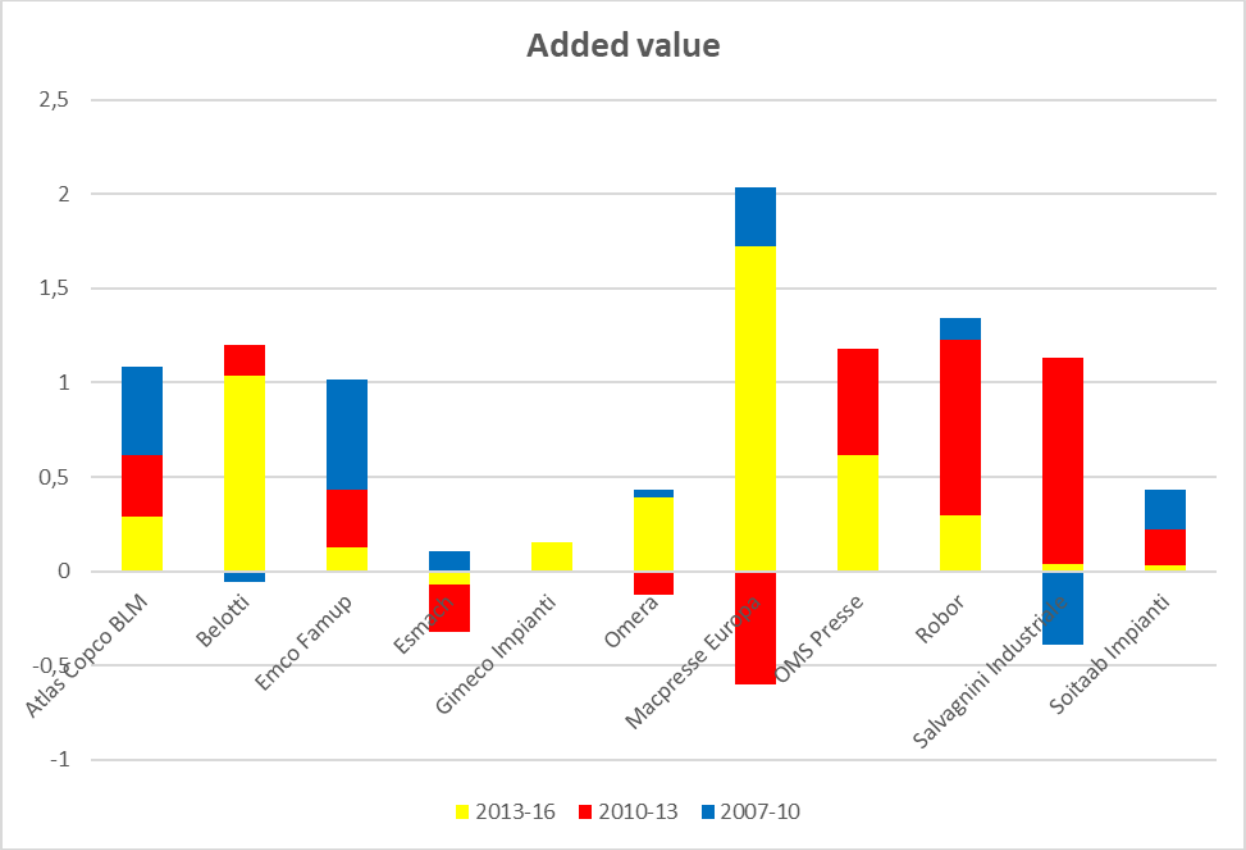
between 2007 and 2011 and subtle descent in the recent period. Liquidity situation is not the best one but remains good.



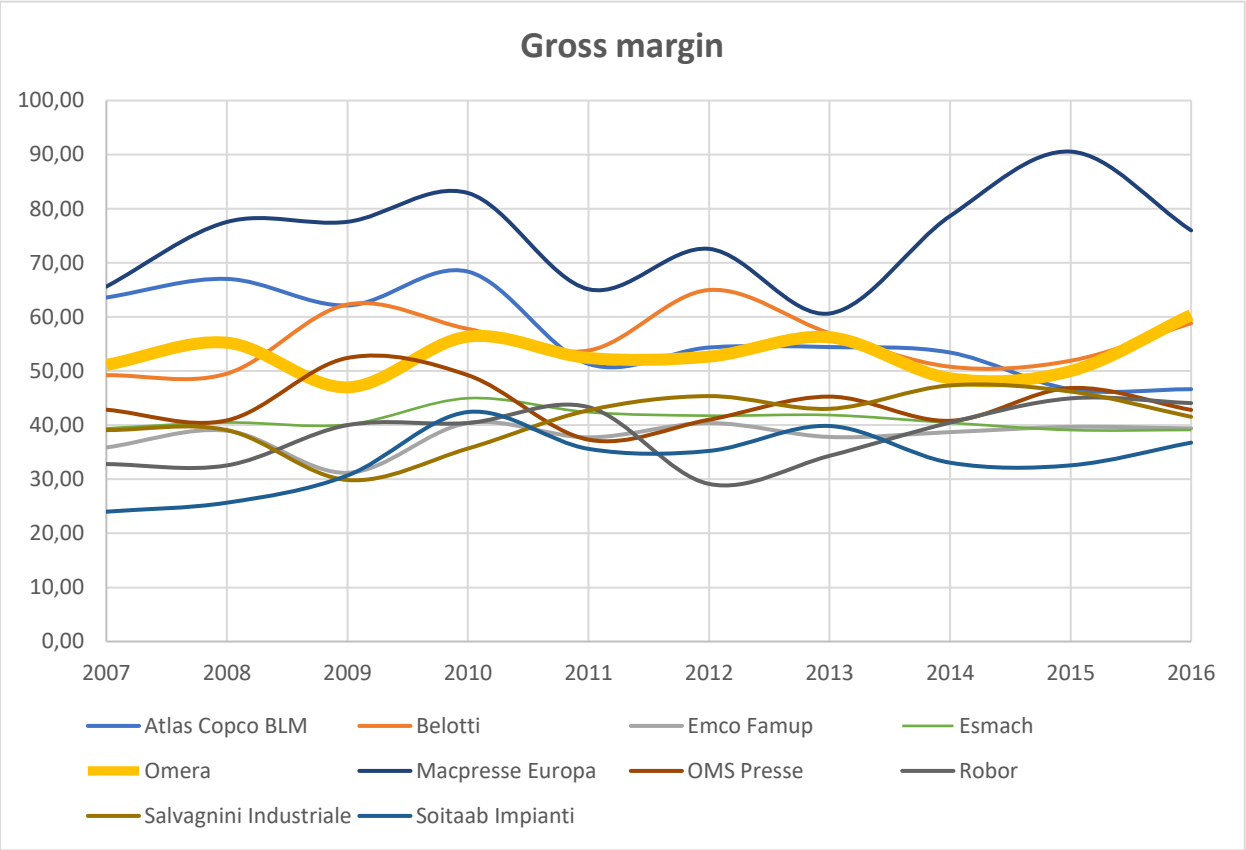
Omera has a huge amount of shareholder funds, compared to its equivalents, with a capital of €5.2 million, more than the double of the second brand, Salvagnini Industriale, stopped at €2.5 million; in this case, earnings and reserves take a smaller part of the funds. The enterprise, like its peer, prefers current liabilities to long-term ones (but is one of the few which use them to finance the business). In general, all the values are steadier than the rest, in a quite turbulent scenario.



Value of production is less variable than other ones, and, excluding two negative peaks in 2008-2009 and 2013, is quite equal to its beginning position. On the other hand, added value is always one of the best of the peer, if not the best itself, and is slightly growing the last exercises, with a rise of more than 25%, but remains much more constant than the rest, as it seeable in the graphic below. Cost of material has the same value and smaller shift than the average and cost of employees and their number are higher and more constant than the rest, with the latter stable at one-hundred units in the last periods; it's negative to state that depreciation are always above other firms' ones, with a considerable growing from 2013, although fixed assets are coming down. P/L results are negative and under the group until 2014, in the last two years they have overcome the breakeven point and are rising, affirming as one of the bests.



The indexes are confirming the recent trends of P/L balance, with only the last two years having positive values, with the ROE passing from a -24% in 2009 to a 12.5% in 2016, after skirting the null point in the middle years, as the next picture shows. It's interesting to notice that the gross profit follows the average before growing and attesting above it from 2015. On the other side, stock turnover is decreasing till one-hundred, but the vast majority is around fifty days: here Omera could improve longer in the next years.



To sum up, the company can't boast good and steady results until the two years period 2014-2015, but in the future could reach a more stable position that justify a part of revenues re-invested in the exploitation of 3DP industry. In the sector, Sisma now occupies a stronger position, for dimensions and results.

Conclusions about the producers

Observing the producers' situation, the easiest thing to notice is that the two companies taken in exam are knowing a lightly stronger growth than almost all the rest of the sector (for Omera this is completely true just in the last two exercises) and that their balance sheet data's trends are usually less variable than the landscape in which they are. The difference with the average is important in the case of Sigma and less for Omera's one, but, to be honest, combining the two analysis together it's not right to say that the inclusion of AM machines in the enterprises' products is

leading the business to such an improvement, although a little increasing, of which additive manufacturing is probably co-responsible, is in act.

On the other hand, the bigger stability of the balance sheet data of the two companies has taken them in a safer situation, balancing the risks of the adoption of a new type of technology and so encouraging it.

Users

Linde Gas Italia S.r.L.

Linde Gas Italia is a leading supplier of industrial gases and a member of The Linde Group, based in Munich, Germany.

The group is focused on Industrial gases (ATECO code 201100) today are used in many fields, such as welding, cooling, heating, industrial cleaning or laboratory analysis. They play an important role in metallurgical processes, crucial in this case, because surface treatment in interested by Additive Manufacturing, in the chemical and food industry, in environmental protection, as well as in the production of glass and electronic components, in the construction, pharmaceutical and research and development sectors.

The sector

The sector is the one identified by the 201000 ATECO code: “Manufacture of basic chemical products, fertilizers and nitrogen compounds, of plastic materials and synthetic rubber in primary shapes”. This one is characterized by great possibilities of expansion and is a sector grown a lot in the last years, thanks to the recent huge technological development and, for this, is very instable.

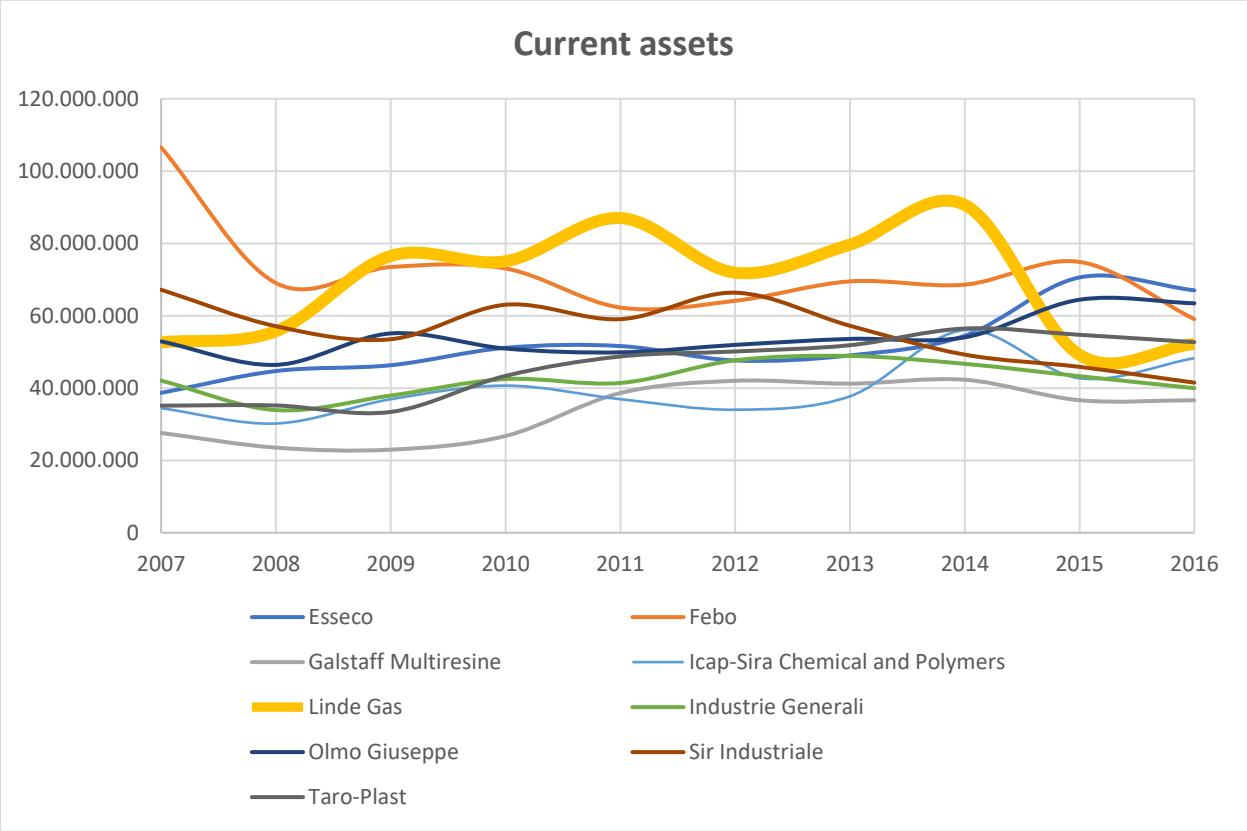
Peer	
Name	201 VL (Very large companies)
Description	Manufacture of basic chemical products, nitrogen-compound fertilizers, plastics and synthetic rubber in primary forms
Size	125 companies

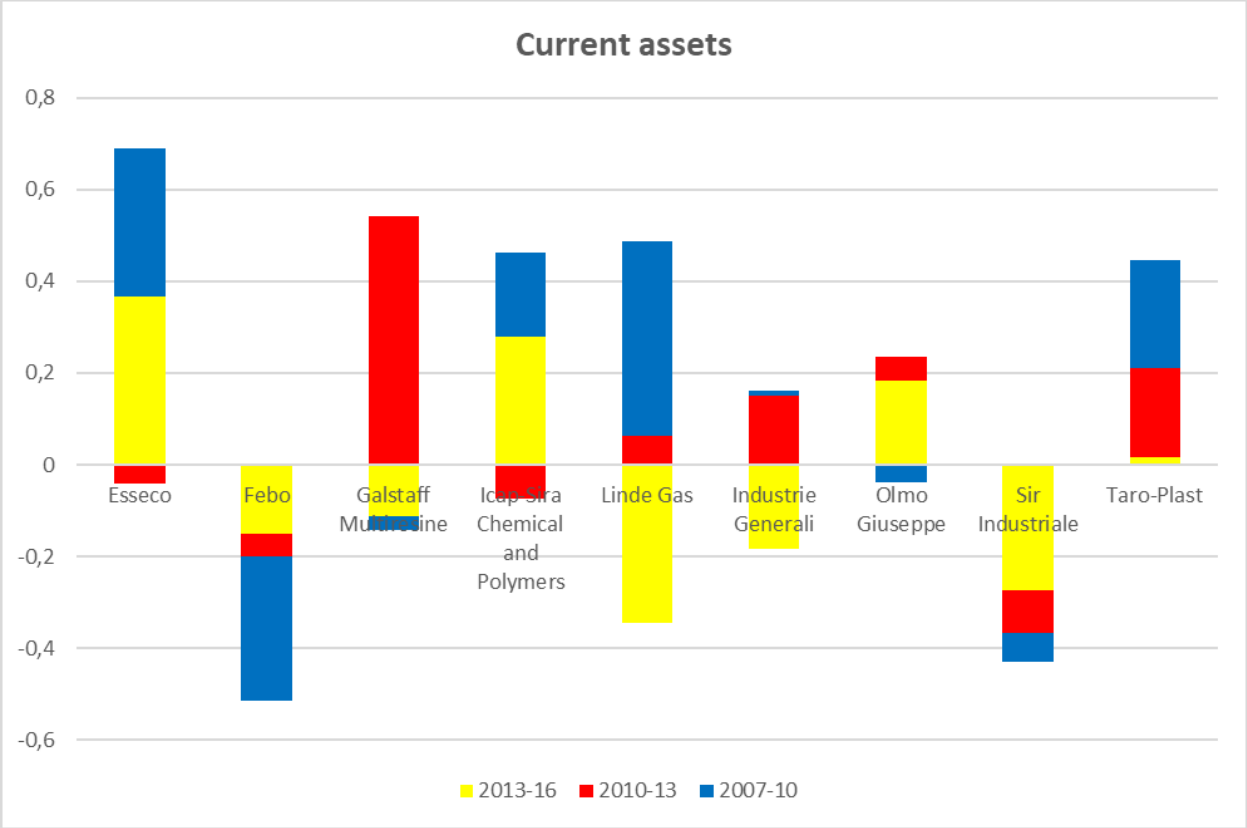
Competitors

Companies	ATECO code	Description
Esseco	201309	Production of other inorganic basic chemicals
Febo	201600	Production of plastic materials in primary shapes
Galstaff Multiresine	201200	Production of dyes and pigments
Icap-Sira Chemical and Polymers	201600	Production of plastic materials in primary shapes
Linde Gas	**201100**	**Production of industrial gases**
Industrie Generali	201600	Production of plastic materials in primary shapes
Olmo Giuseppe	201600	Production of plastic materials in primary shapes
Sir Industriale	201600	Production of plastic materials in primary shapes
Taro-Plast	201600	Production of plastic materials in primary shapes

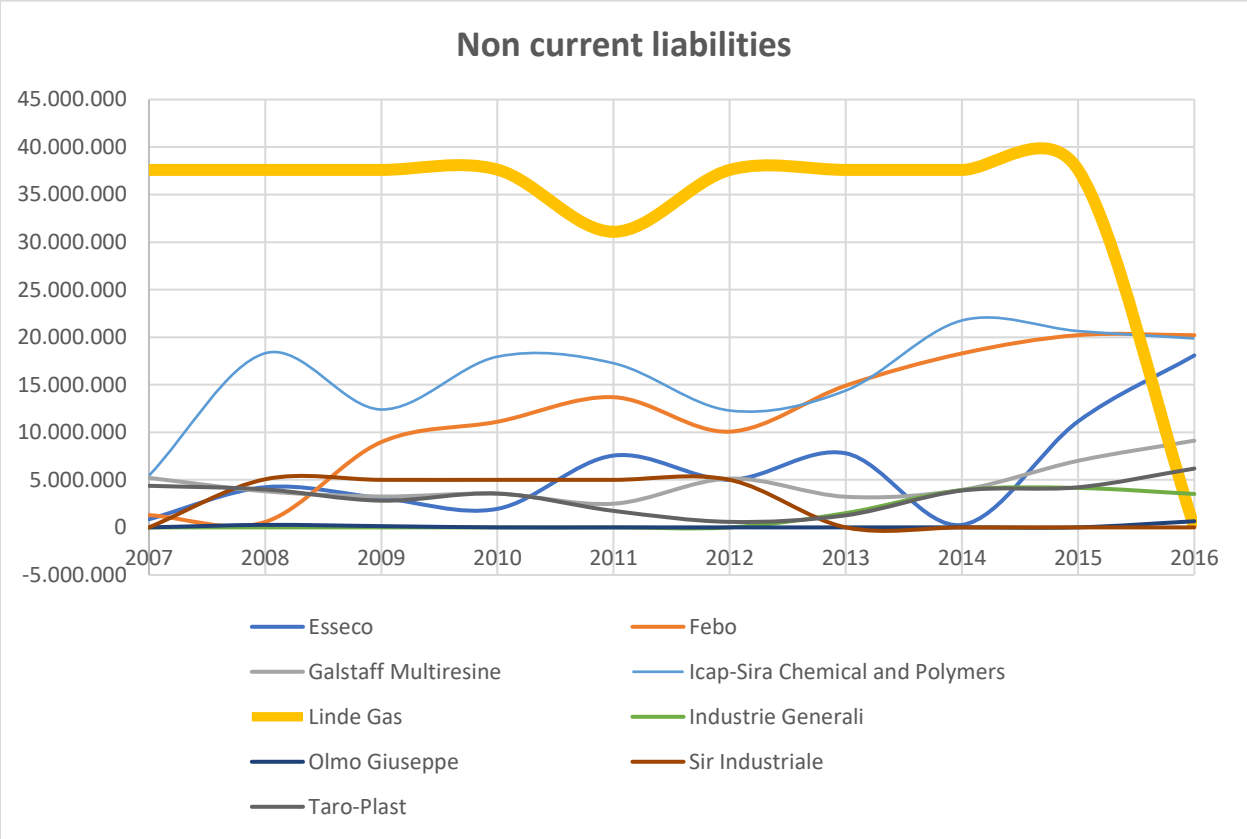
General comments

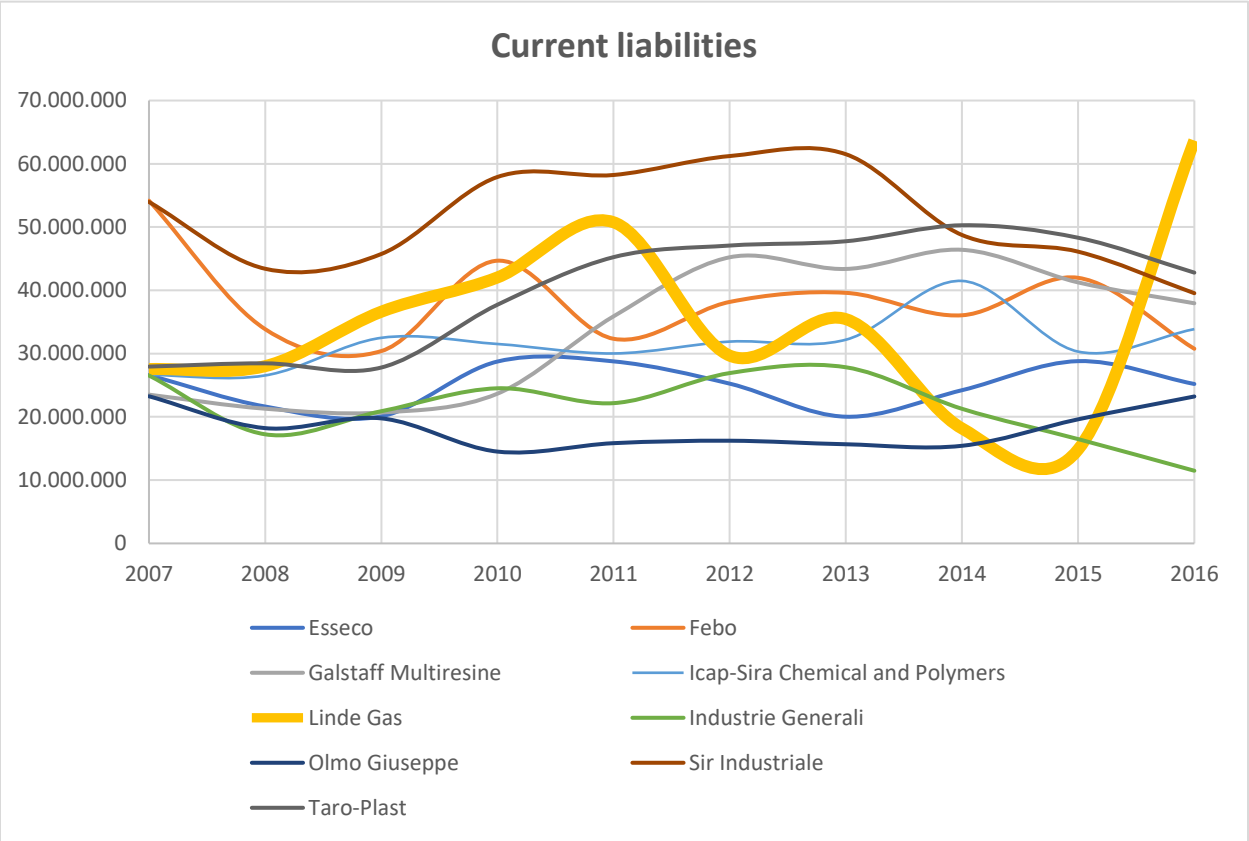
Total assets are higher than the rest of the peer in all the exercises. Fixed assets are always the biggest ones: after a negative peek in 2014, they've grown up passing from €79 million to €110 million in only two years; tangible assets are much bigger than intangible one, but it's curious to state that the item "plant and machinery" is always decreased in the ten years period, although a light rise in the last two years (and a descent in the previous ones). Current assets are more variable than the average, usually higher than it, but not in the last to exercises, due to a collapse between 2014 and 2015. Stocks are variable and lower than almost all the rest. It has too much receivables and the liquidity situation, not bad, however is worse than the other firms.


Current assets
120.000.000
100.000.000
80.000.000
60.000.000
40.000.000
20.000.000
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Esseco
Febo
Galstaff Multiresine
Icap-Sira Chemical and Polymers
Linde Gas
Industrie Generali
Olmo Giuseppe
Sir Industriale
Taro-Plast

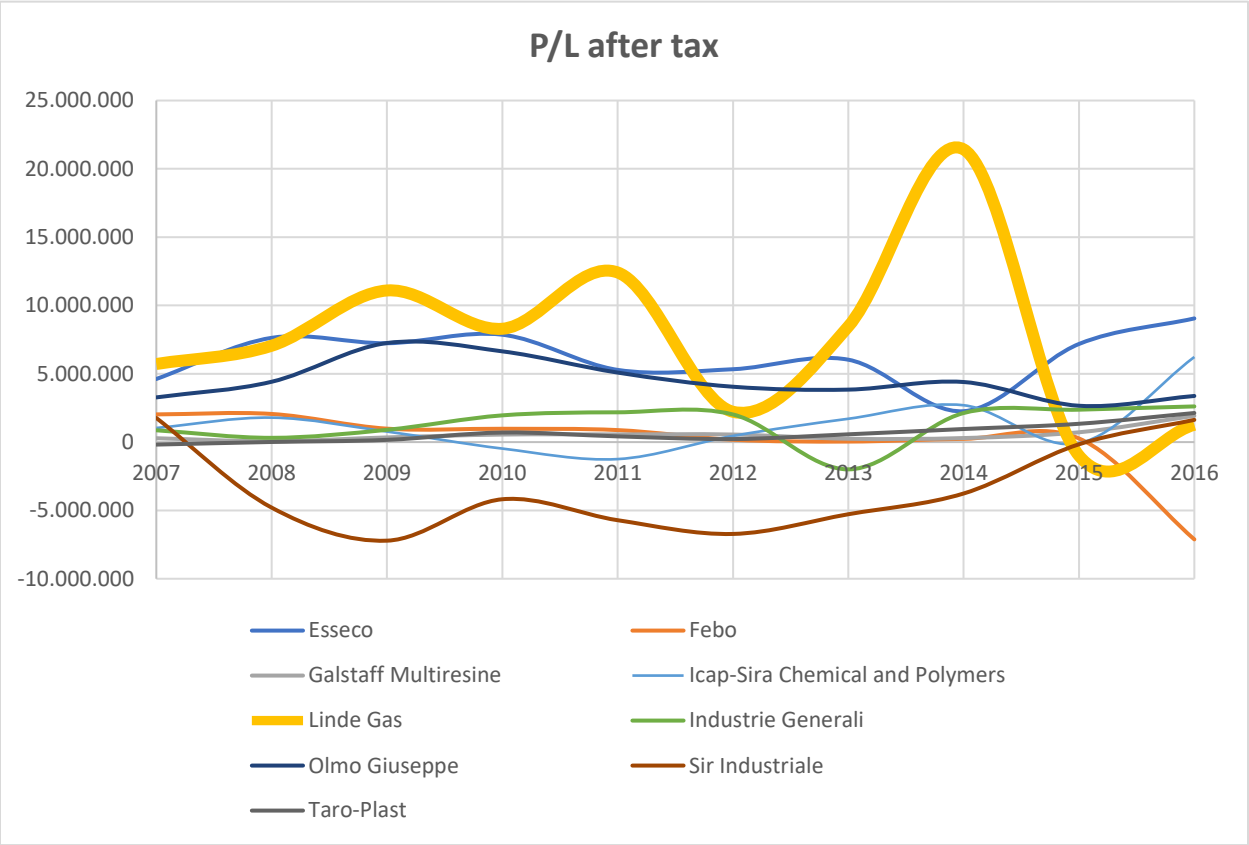

Current assets
0,8
0,6
0,4
0,2
0
-0,2
-0,4
-0,6
Esseco
Febo
Galstaff Multiresine
Icap-Sira Chemical and Polymers
Linde Gas
Industrie Generali
Olmo Giuseppe
Sir Industriale
Taro-Plast
2013-16
2010-13
2007-10

Shareholder funds are the highest of the peer every year: capital is steady at €25 million, with the exception of 2012, in which is €67 million. Long-term debts are drastically decreased in the last years, because the enterprise has decided to fund its business with current ones, as it's seeable in the two pictures below.

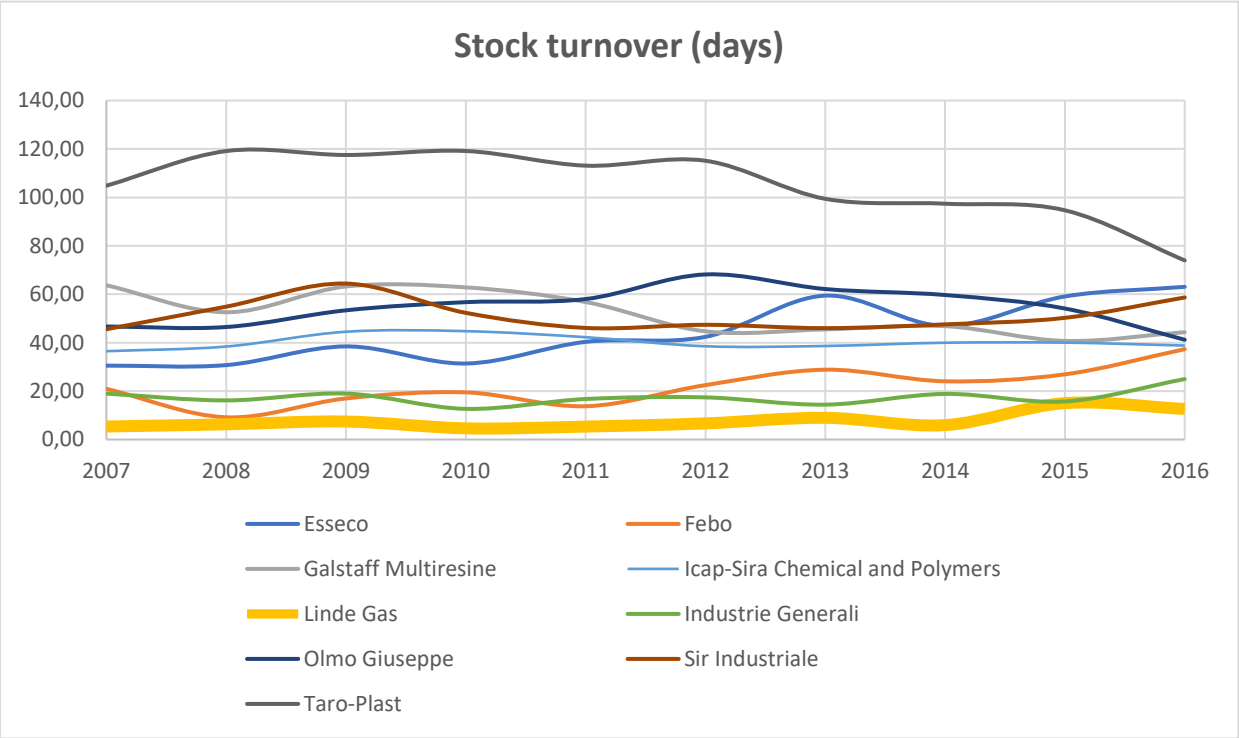




Cost of production and added value has been the highest and one of the highest for years, before an important descent in the last period, particularly for the previous one, more than halved in just three exercises; it could be important to notice that, although these bad trends, the amount of the recent years is €7 million bigger than former one. With the decrease of the production, cost of materials have followed the same path, but in a less drastic way; cost of employees is very steady and it's six years that it's struck at about €12 million, more than the mean value, in line with the number of them. Generally P/L are vary variable and it's difficult to determine a specific trend: the picture below shows the one after taxes.



In parallel, indexes results are difficult to be investigated for the whole group; gross margin is around 45% in the last two years and 30% in the former ones and stock turnover is much lower, with a maximum point of 15 days in 2015.



Totally, Linde Gas Italia shows both good and bad results in its items, but with great potentialities, which allow the adoption of the new technique and that in the future, bonded with the use of it, could bring to an advantage position over the others.

Altair Chimica S.p.A.

Presentation

Altair Chimica S.p.A., a company of Esseco Group, an Italian leading enterprise in inorganic chemistry, is a firm operating in this field (ATECO code 201309), giving absolute importance to the relationship between industrial activity and environment by producing through the new mercury-free chlor-potash plant using membrane cell technology, the most advanced in the world.

Its plant is located in Saline di Volterra (Pisa).

The sector

The sector is the same previously introduced (ATECO code 201000).

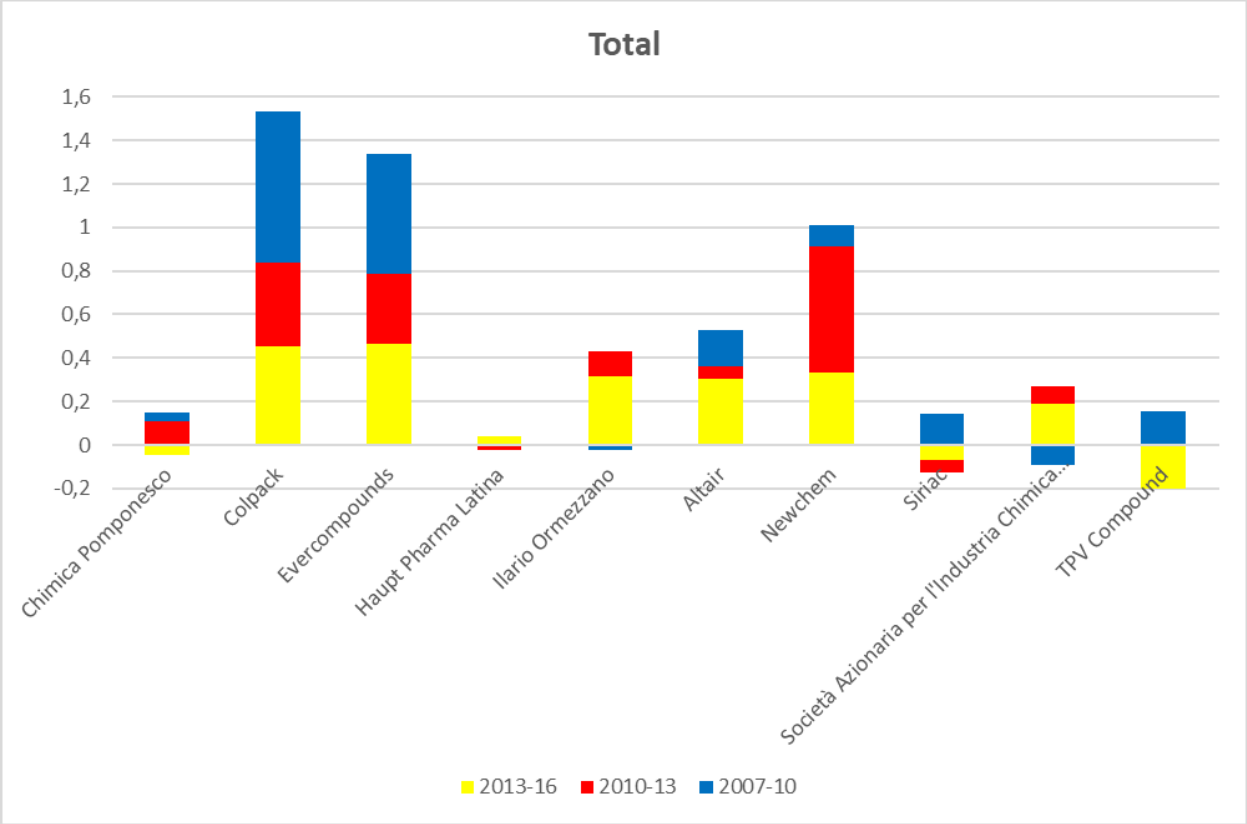
Peer	
Name	201 VL (Very large companies)
Description	Production of basic chemical products, fertilizer nitrogen compounds, plastics and synthetic rubber in primary shapes
Size	125 companies

Competitors

Companies	ATECO code	Description
Chimica Pomoponesco	201000	Production of basic chemical products, fertilizer nitrogen compounds, plastics and synthetic rubber in primary shapes
Colpack	201600	Production of plastic materials in primary shapes
Evercompounds	201700	Production of synthetic rubber in primary forms
Haupt Pharma Latina	201000	Production of basic chemical products, fertilizer nitrogen compounds, plastics and synthetic rubber in primary shapes
Ilario Ormezzano	201000	Production of basic chemical products, fertilizer nitrogen compounds, plastics and synthetic rubber in primary shapes
Altair Chimica	**201309**	**Production of other inorganic basic chemicals**
Newchem	201400	Production of other organic basic chemicals
Siriac	201500	Production of fertilizers and nitrogen compounds (excluding the manufacture of compost)
Società Azionaria per l'Industria Chimica Italiana	201600	Production of plastic materials in primary shapes
TPV Compound	201600	Production of plastic materials in primary shapes

General comments

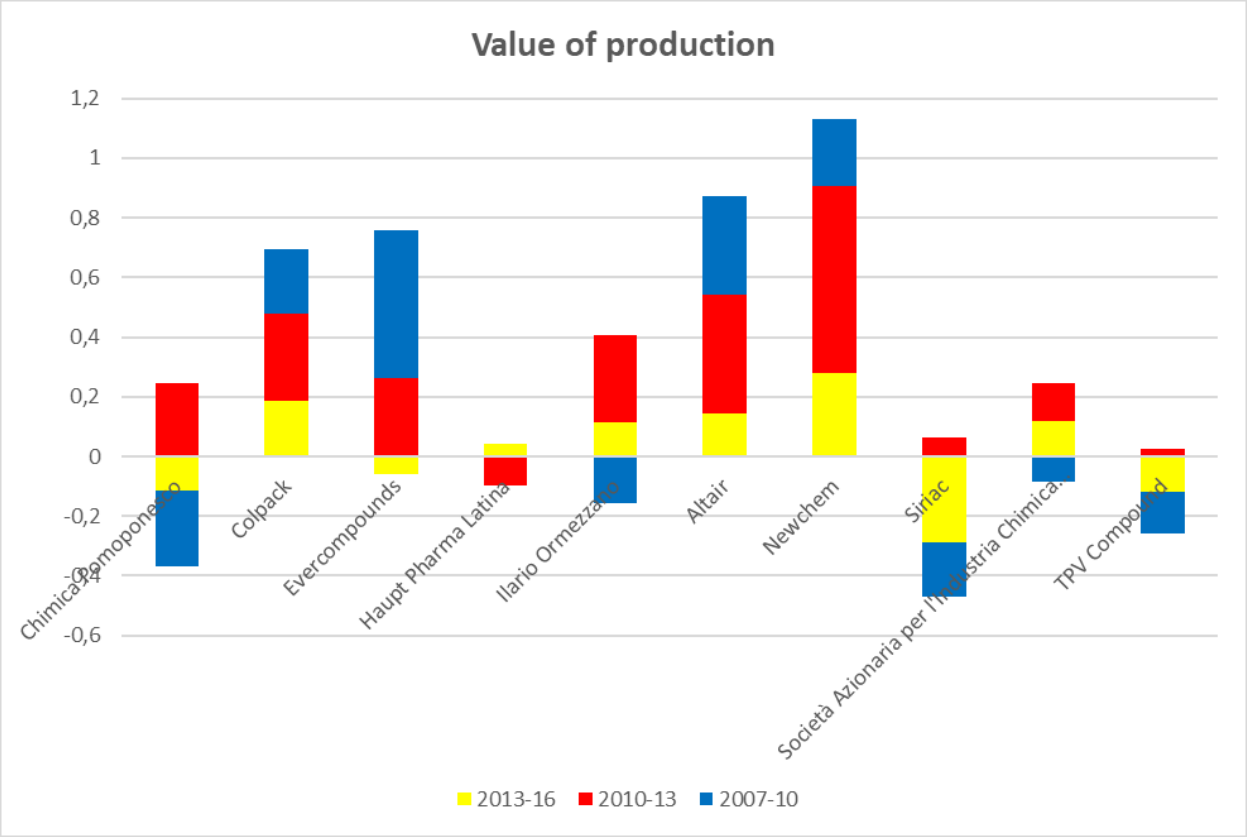
Considering the assets, total ones fluctuate around the mean value: Altair Chimica is focused more in fixed ones (much more tangible than intangible) than in current ones, with the former ones above the average and the latter ones below it. The amount of stocks respects the average too and the liquidity situation is good, but not such as the majority of the entire peer. Changings follow the general situation too.



Shareholder funds, after being in average for almost the whole period, are rapidly increasing in the last two years, becoming ones of the highest. In particular, the enterprise has always a capital of a bit less than €3 million (more than the rest of the sector) and relies more in current liabilities than in non-current ones (like the whole sector but a little more than it).

Coming to the Income Statement, the value of production is augmented more than average in the last exercises (but without a huge increase, by the truth), with added value following a similar track. The cost of material, after a rapid growing

between 2007 and 2009, is very constant, more than the rest of the group and, considered with the changings in the value of production, it's a good news; the cost of employees and its number are knowing a light rise, after a minuscule negative peak between 2010 and 2011. Operative P/L and P/L after taxes, passed a period near to the break-even point or just a little more, are strongly enhancing in the last three exercises, reaching such better results than almost all the rest of the peer.



Indexes results follow the growing of P/L ones: after a period along the line of the zero, a rise is taking place in the last period, more or a little more (depends on the item considered) than the others; gross margin is risen exceeding the 40%, over the mean value; stock turnover is grown up to with value of production, reaching more than forty days: still a good result and in soft decrease.

Totally, having similar structure and dimensions of other firms, Altair Chimica obtains better results, and that's could be a reason for the exploration and adoption of AM in the recent period.

Iris S.r.L.

Presentation

This company, based in Torricella (Taranto), is a producer of metallic structures and assembled parts of structures (ATECO code 251100). Unluckily, it was impossible to find more information than these few ones.

The sector

The general sector is the one identified with ATECO code 251000: “Manufacture of elements of metal constructions”.

Peer	
Name	251 VL (Very large companies)
Description	Manufacture of metal building elements
Size	1.274 companies

Competitors

Companies	ATECO code	Description
C.B.L.	251100	Manufacture of metal structures and assembled parts of structures
Cosmec	251100	Manufacture of metal structures and assembled parts of structures
DOM Ducoli Officine metalmeccaniche	251100	Manufacture of metal structures and assembled parts of structures
Fratelli Aguzzi	251100	Manufacture of metal structures and assembled parts of structures
Gefa Italia	251100	Manufacture of metal structures and assembled parts of structures
Iris	**251100**	**Manufacture of metal structures and assembled parts of structures**
Industria di Carpenteria DMZ	251100	Manufacture of metal structures and assembled parts of structures
Montaggi Industriali	251100	Manufacture of metal structures and assembled parts of structures
N.C.M.	251100	Manufacture of metal structures and assembled parts of structures
Se.Pa.M.	251210	Manufacture of doors, windows and their looms, metal shutters and gates
Tecnomais	251100	Manufacture of metal structures and assembled parts of structures

General Comments

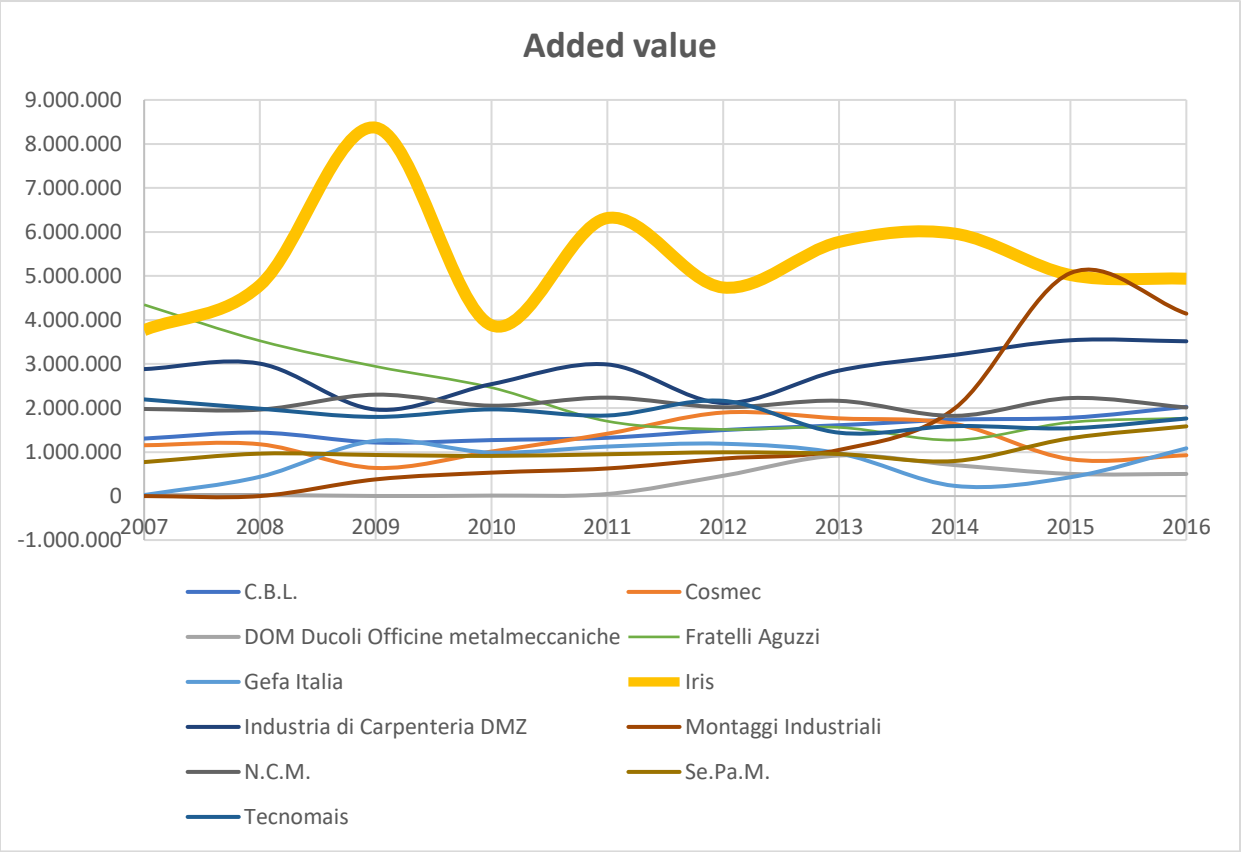
Iris has high total assets compared with the majority of the group, with both fixed (null intangible) and current ones bigger than the mean values. Stocks are respecting the average, with a very low decrease in the last three years. Receivables are very high and the amount of liquidity is gone down with time passing.

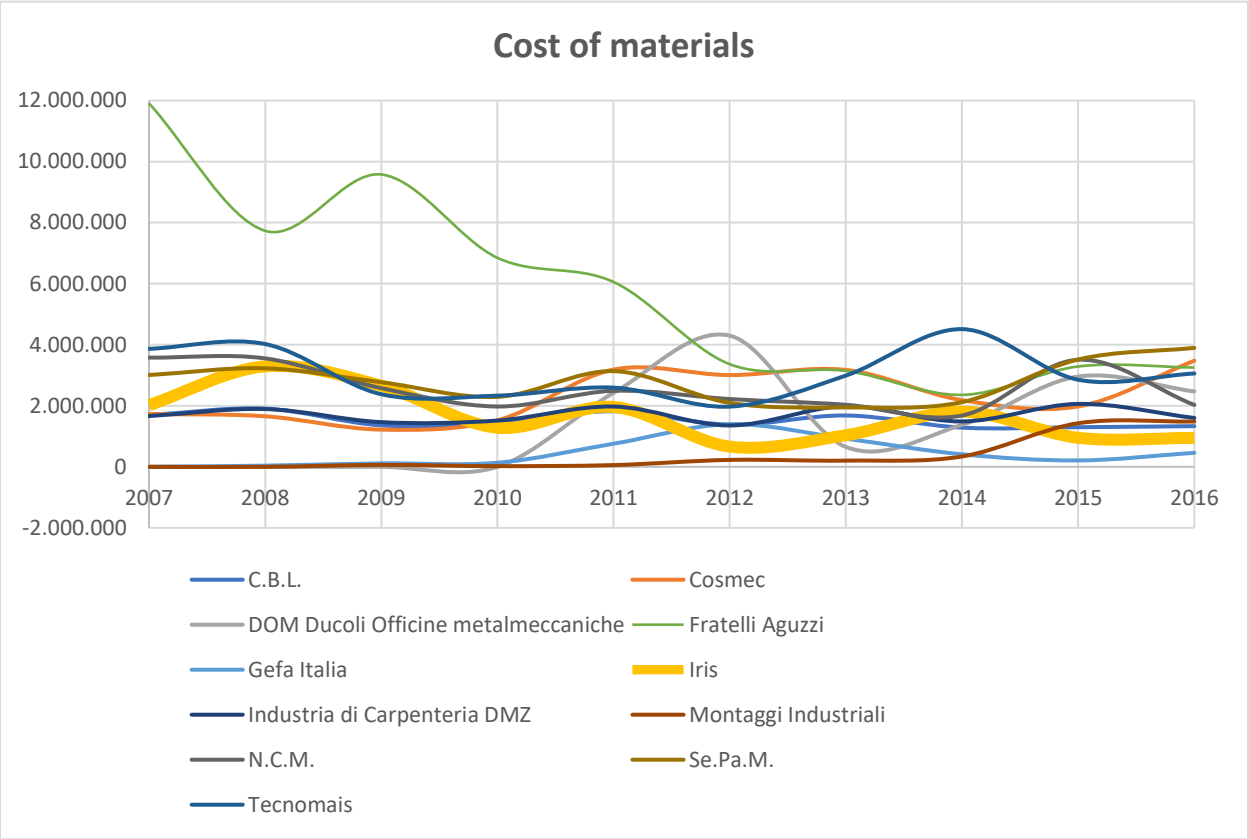
Considering shareholder funds, they are quadruplicated in ten years, passing from the lowest positions to the first ones: the capital is steady at €0.25 million, one of the biggest of the peer. Non-current and current liabilities are not so different (€3

million and €4 million), compared to other enterprises combinations, with the second ones following the average and the first ones above it.

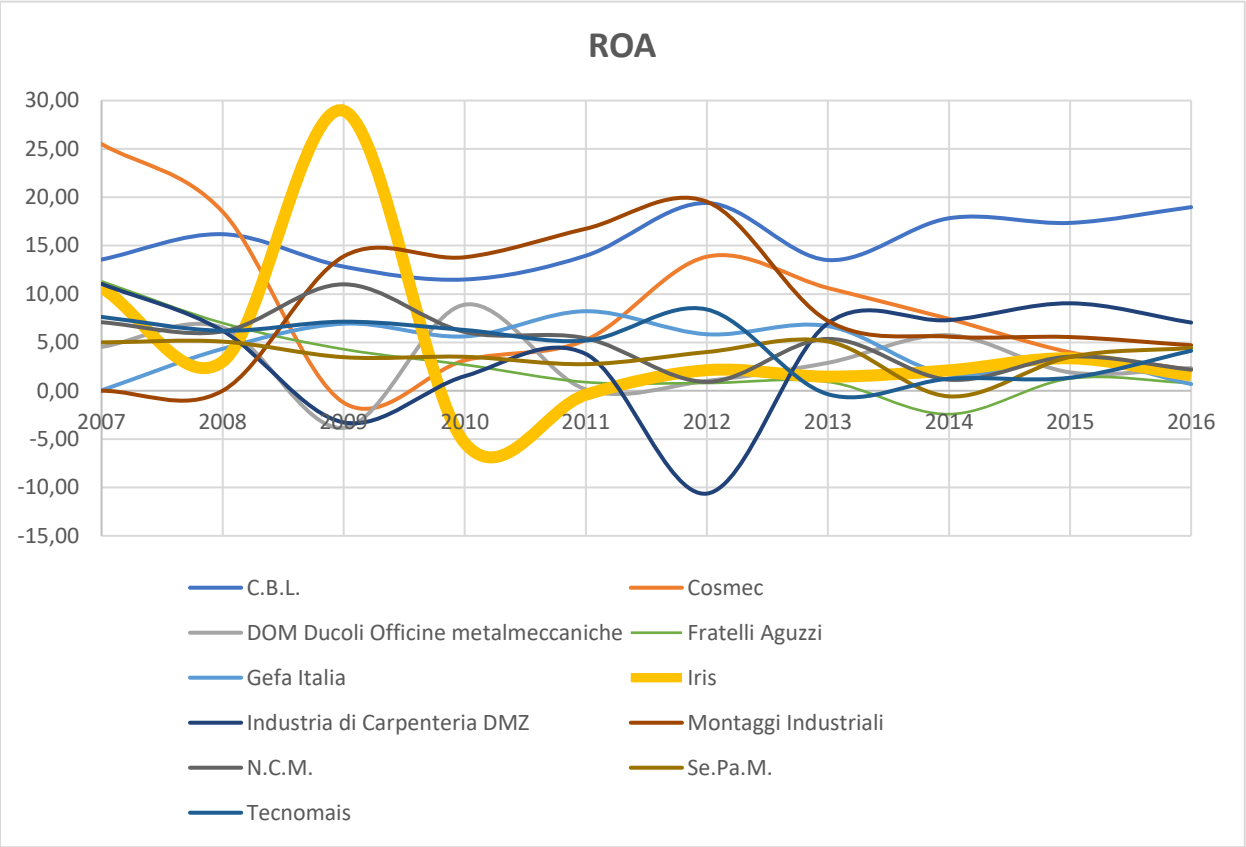
Value of production is decreased until 2009, in a mutable landscape, and totally around the mean value in the last years, whereas added value is the highest of the group: that's a very good thing for the production chain of the firm. To state that, cost of materials, in a field which is not following a precise trend, is slightly falling down. On the other hand, costs of employees are very high and bigger than the rest but in decrease, alongside the total number of persons employed in the company. Depreciations, after a peak of over one million between 2011 and 2013, are now steady at a little more than half a million, still much more than the others.

P/L results, after a big positive peak in 2009, are fluctuating around the line of the zero, following the peer's tendencies.





The indexes trends proceed as P/L data, like ROA graphic below shows; on the contrary, gross margin of the sector are very good, and Iris' ones more than others, over 80%. Unfortunately, a few stock turnover information were available for the group, with Iris' ones being much better than them.



To sum up, the firms presents, as well as big dimensions, quite good economic results and good operative ones, with added value not raising but constantly much over the average, although the costs remain too high. However it is in a good situation which allows the adoption of 3DP and its fine potentialities could lead to better results in the future.

Bodycote Trattamenti Termici S.p.A.

Presentation

Bodycote Trattamenti Termici, based in Rodengo Saiano (Brescia), is a company of the worldwide group Bodycote, focused on heat treatment, a technology encompassing a variety of techniques and specialist engineering processes with the aim of improving the properties of metals and alloys and extend the life of components and is a vital part of any manufacturing process. Metals are made by this technique stronger, more durable and more corrosion resistant, and the specific sector is metal treatment and coating (ATECO code 256100).

The sector

According to Plimsoll, in Italy more than a half of the principle brands of the sector obtains negative results.

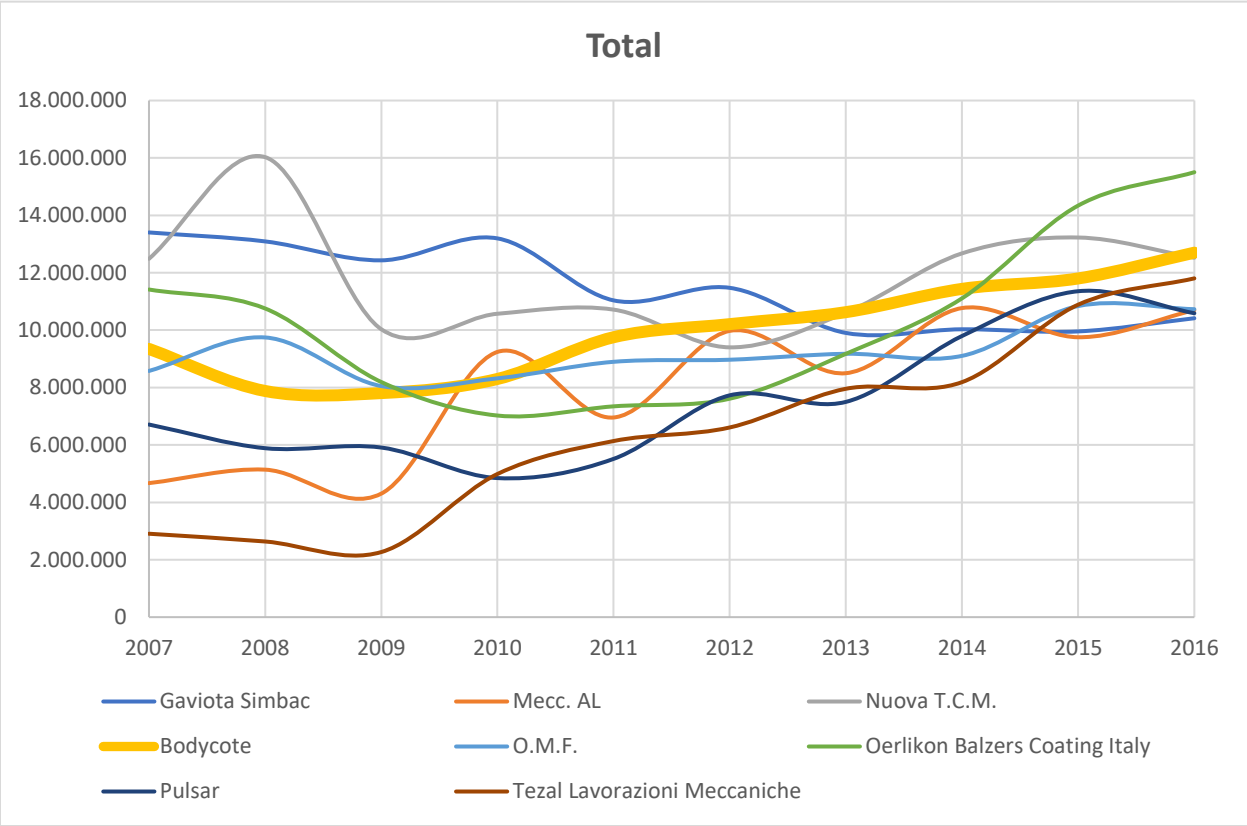
Peer	
Name	256 VL (Very large companies)
Description	Treatment and coating of metals; general mechanics work
Size	1.382 companies

Competitors

Companies	ATECO code	Description
Gaviota Simbac	256200	General mechanics work
Mecc. AL	256200	General mechanics work
Nuova T.C.M.	256200	General mechanics work
Bodycote	**256100**	**Treatment and coating of metals**
O.M.F.	256200	General mechanics work
Oerlikon Balzers Coating Italy	256100	Treatment and coating of metals
Pulsar	256200	General mechanics work
Tezal Lavorazioni Meccaniche	256200	General mechanics work
Trattamenti Termici Ferioli & Gianotti	256100	Treatment and coating of metals

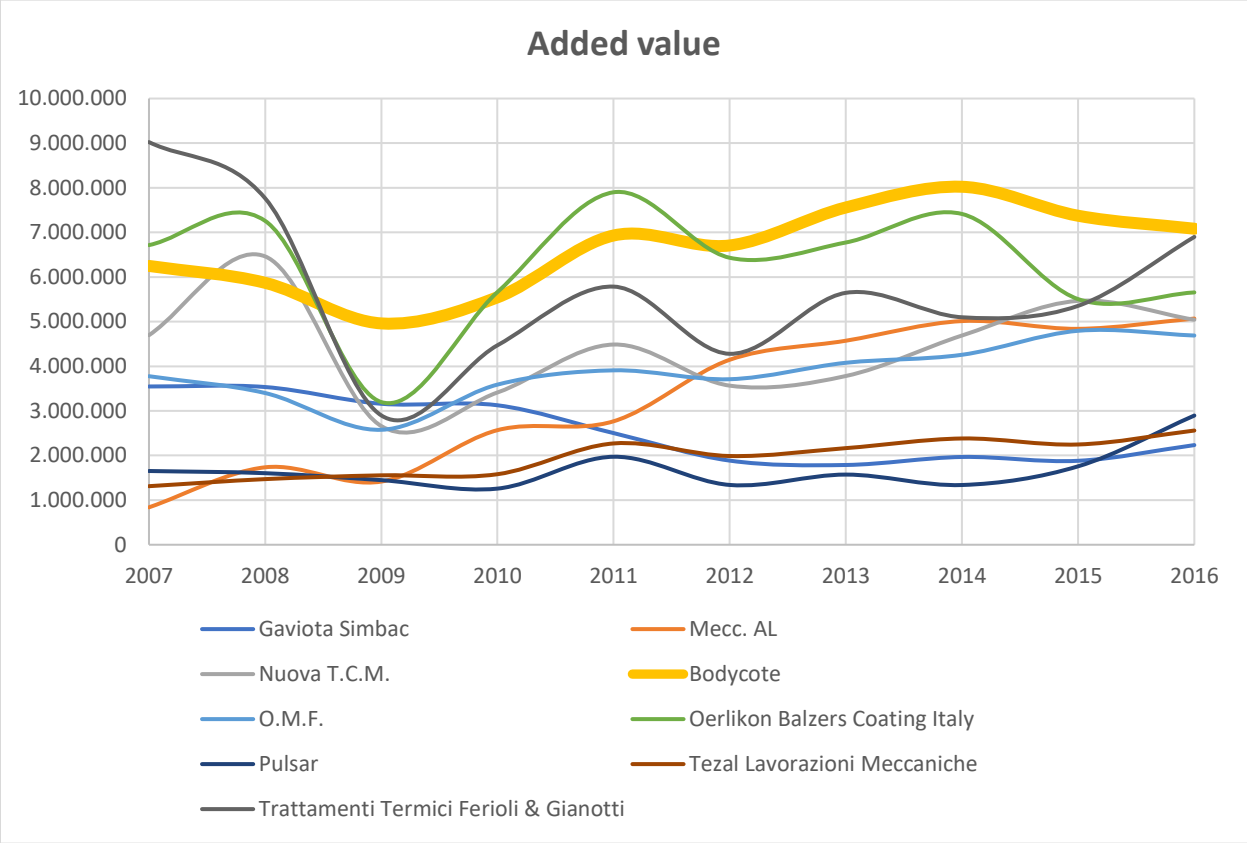
General Comments

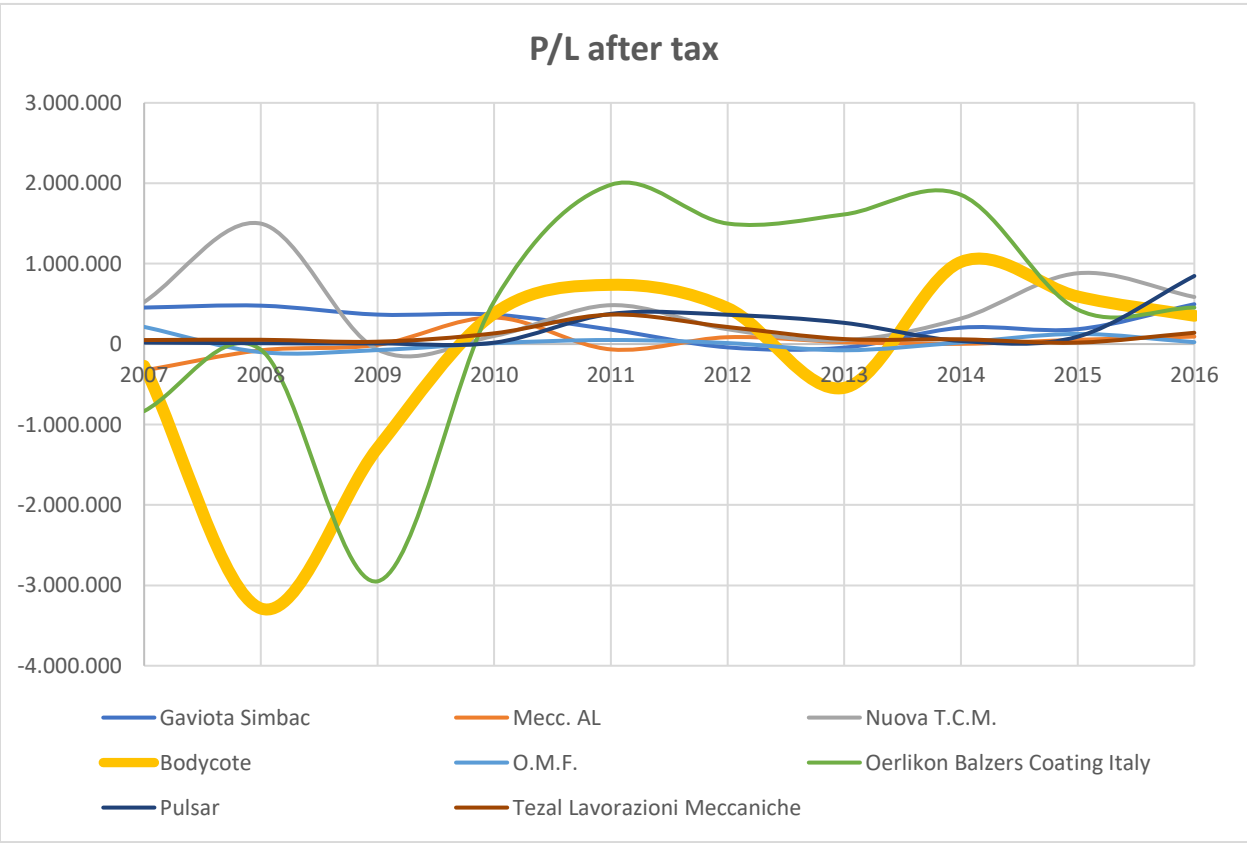
Total assets are growing as the rest of the sector, remaining lightly higher than the mean value for all the time; in particular, current ones are bigger than fixed ones (intangible almost null). Stocks are constant and much lower than the majority of other enterprises and the liquidity, after the positive peaks between 2008 and 2010 is very low too.



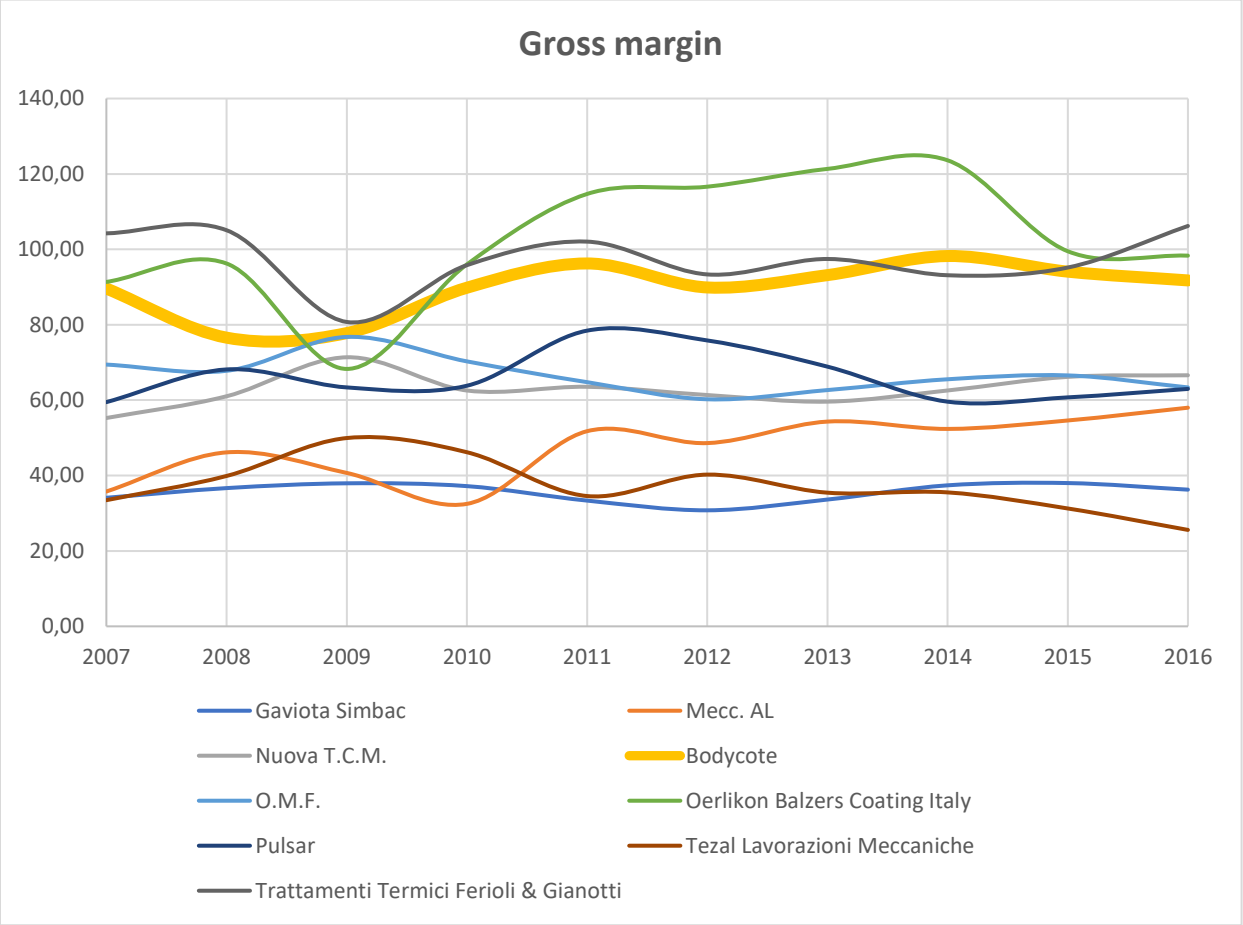
Shareholder funds respect the average, with a steady capital of €0.52 million. Non-current liabilities are null in the last exercises, while current ones are one of the highest, at around €7.3 million in 2016.

Value of production is grown less than the others in the last years, but added value is still the best of the group, although increased less than the majority of the companies. This is very high due to the very low costs of materials, always under €2 million and clearly one of the bests; on the other side, cost of employees are the biggest ones, with the number of employees being one of the highest but in light decrease in the last years and the previous ones in light increase; depreciations remains one of the tallest too, always over €1 million. P/L results, after the negative peak caused by 2008 crisis, are fluctuating just a little over the line of the zero and the mean value.


Added value
10.000.000
9.000.000
8.000.000
7.000.000
6.000.000
5.000.000
4.000.000
3.000.000
2.000.000
1.000.000
0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Gaviota Simbac
Mecc. AL
Nuova T.C.M.
Bodycote
O.M.F.
Oerlikon Balzers Coating Italy
Pulsar
Tezal Lavorazioni Meccaniche
Trattamenti Termici Ferioli & Gianotti


P/L after tax
3.000.000
2.000.000
1.000.000
0
-1.000.000
-2.000.000
-3.000.000
-4.000.000
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Gaviota Simbac
Mecc. AL
Nuova T.C.M.
Bodycote
O.M.F.
Oerlikon Balzers Coating Italy
Pulsar
Tezal Lavorazioni Meccaniche

Indexes follow the same path of P/L ones, with a negative peak in 2008 and a smaller one in 2013: generally, they are quite better than average. Gross margin is good: more than 90% and one of the bests. Stock turnover is in the same situation, always under twenty days.



To end, Bodycote reaches medium quality results, compared to the rest of the group, but its powerful added value and gross margin suggest it has stronger improvement margin than the mean value of the sector.

Sefa S.r.L.

Presentation

Established in the early 2000's as an outsourcing company, nowadays Sefa S.r.L., based in Molfetta (Bari), is also able to support the client in the stage of design and streamlining of its components, either for executive single details (parts) or for assembled components, the ATECO code identifying its sector is 256200, general mechanic's works.

Works are executed using customer's draws or samples, using metallic materials or plastic ones and suppling all the items with heat and surface treatments. Above all, the enterprise is specialized in the construction of spindles, calibers and assembled structures.

The sector

The sector is the one introduced by ATECO code 256200, further information were not available.

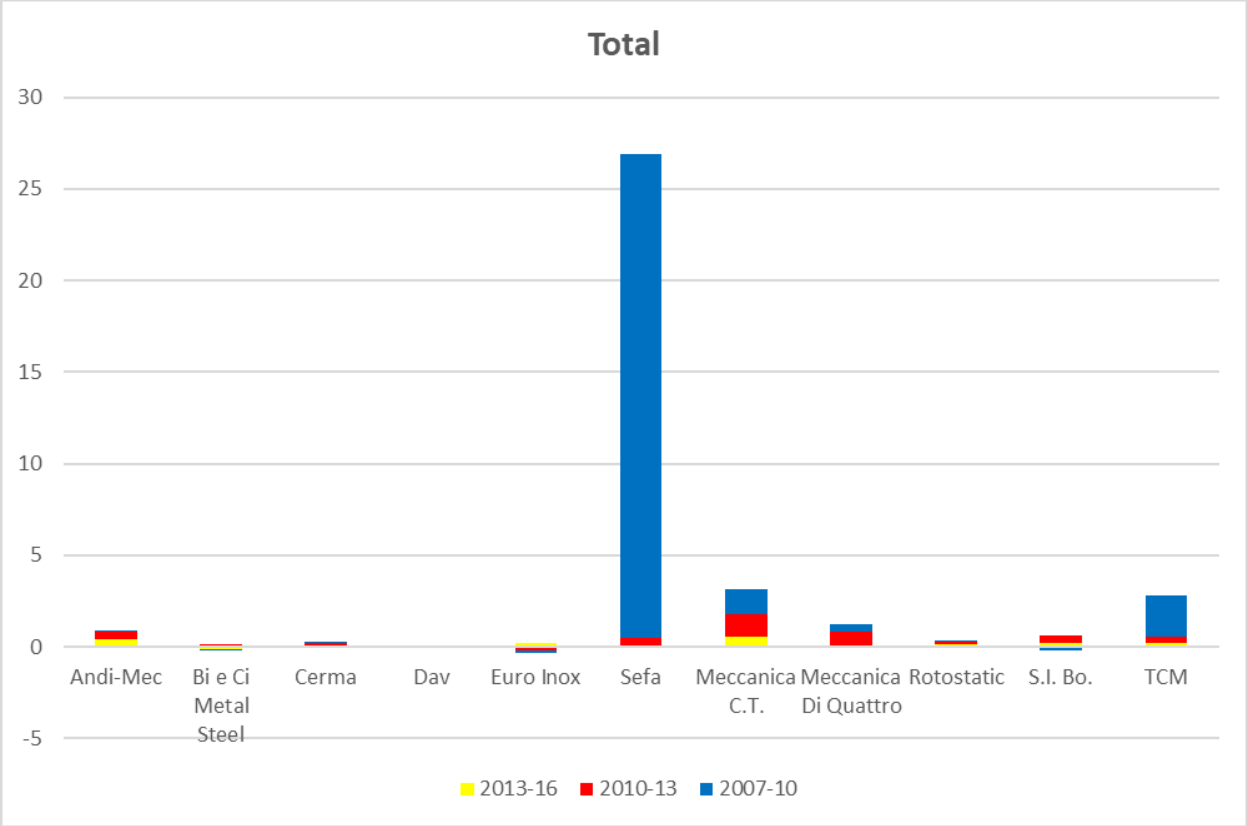
Peer	
Name	256 VL (Very large companies)
Description	Treatment and coating of metals; general mechanics work
Size	1.383 companies

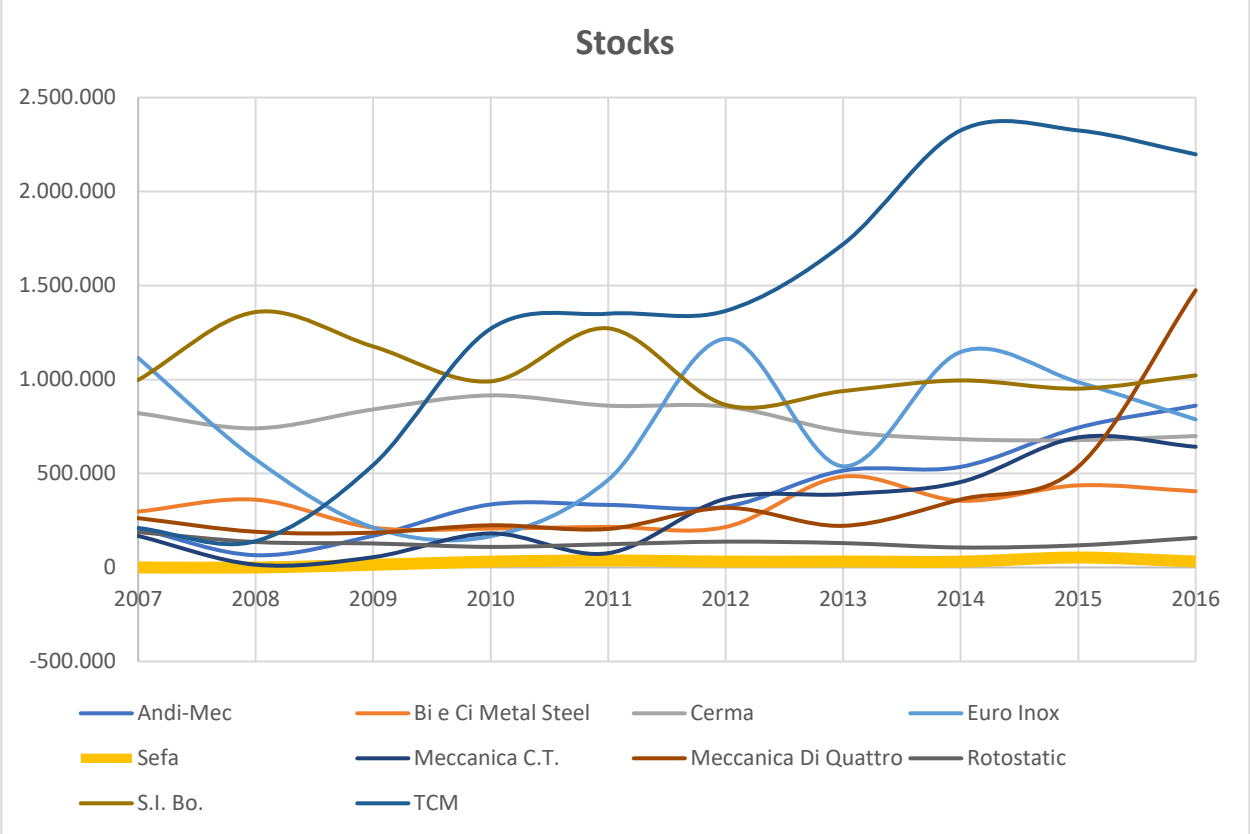
Competitors

Companies	ATECO code	Description
Andi-Mec	256200	General mechanics work
Bi e Ci Metal Steel	256200	General mechanics work
Cerma	256200	General mechanics work
Dav	256200	General mechanics work
Euro Inox	256200	General mechanics work
Sefa	**256200**	**General mechanics work**
Meccanica C.T.	256200	General mechanics work
Meccanica Di Quattro	256200	General mechanics work
Rotostatic	256100	Treatment and coating of metals
S.I. Bo.	256200	General mechanics work
TCM	256200	General mechanics work

General Comments

Total assets of that company have grown up a lot in the last ten years: after a staggering rise in the first period taken in exam, they have reached the mean value and settled around it; for fixed and current ones the situation is the same, whereas the amount of stocks is almost null.

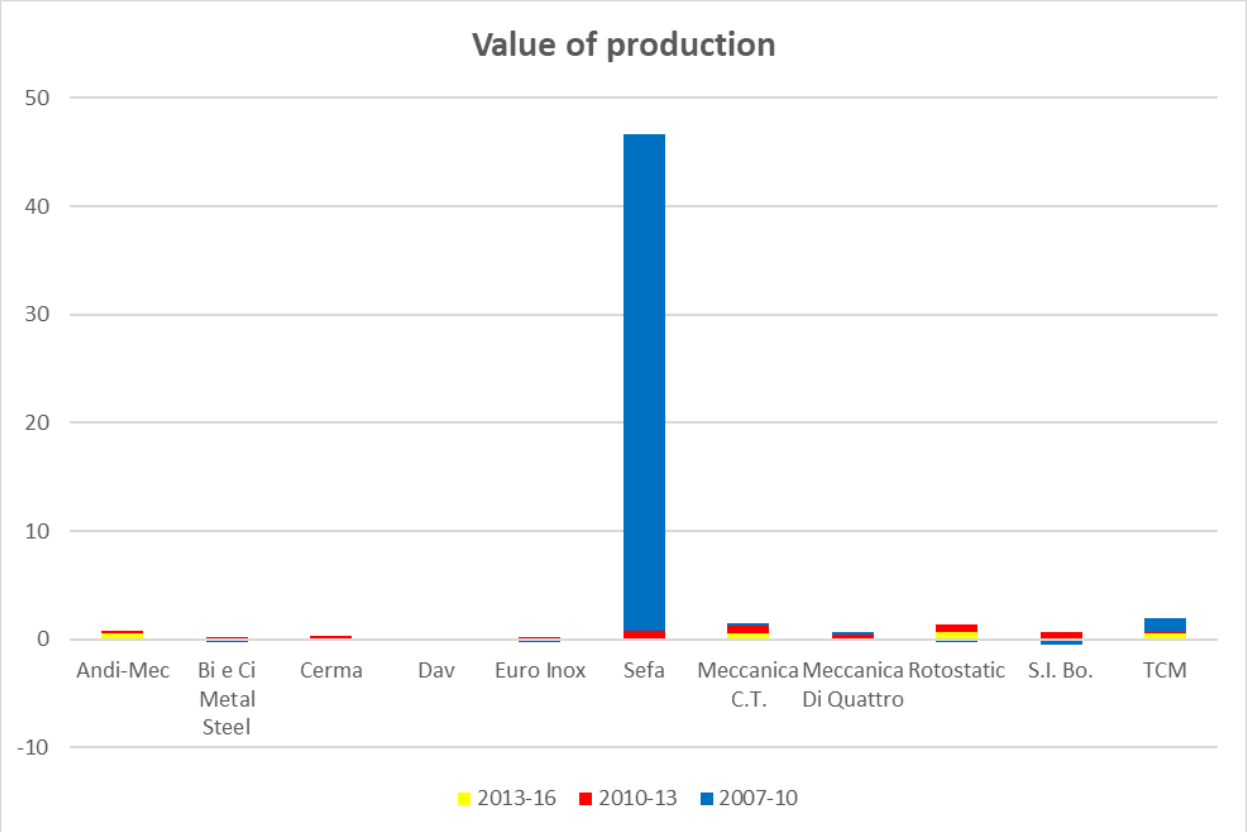

Total
30
25
20
15
10
5
0
-5
Andi-Mec
Bi e Ci Metal Steel
Cerma
Dav
Euro Inox
Sefa
Meccanica C.T.
Meccanica Di Quattro
Rotostatic
S.I. Bo.
TCM
2013-16
2010-13
2007-10

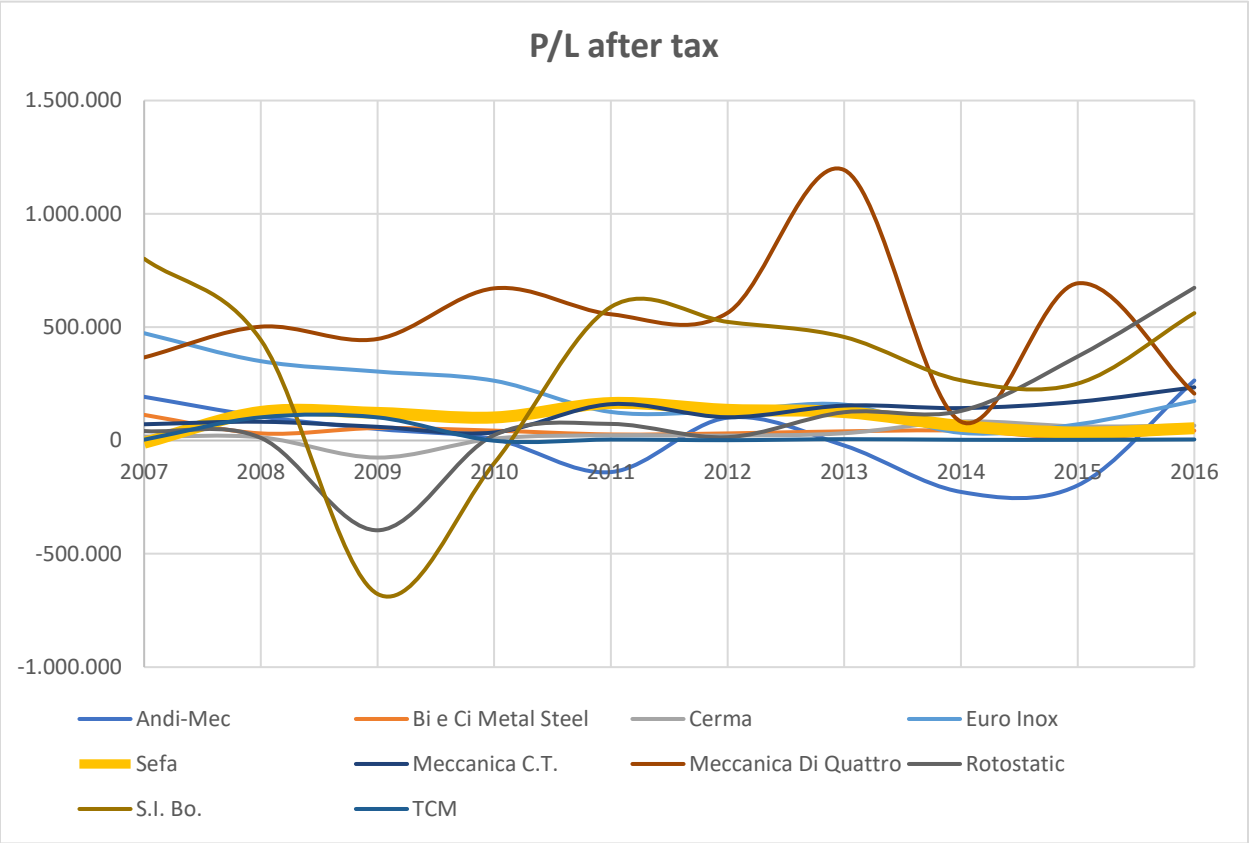

Stocks
2.500.000
2.000.000
1.500.000
1.000.000
500.000
0
-500.000
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Andi-Mec
Bi e Ci Metal Steel
Cerma
Euro Inox
Sefa
Meccanica C.T.
Meccanica Di Quattro
Rotostatic
S.I. Bo.
TCM

Although the capital is constant at only €50,000, the shareholder funds have risen considerably in the last years: the company has decided to entrust the funding of its business more to current liabilities (in arise) than to non-current ones (in descent).

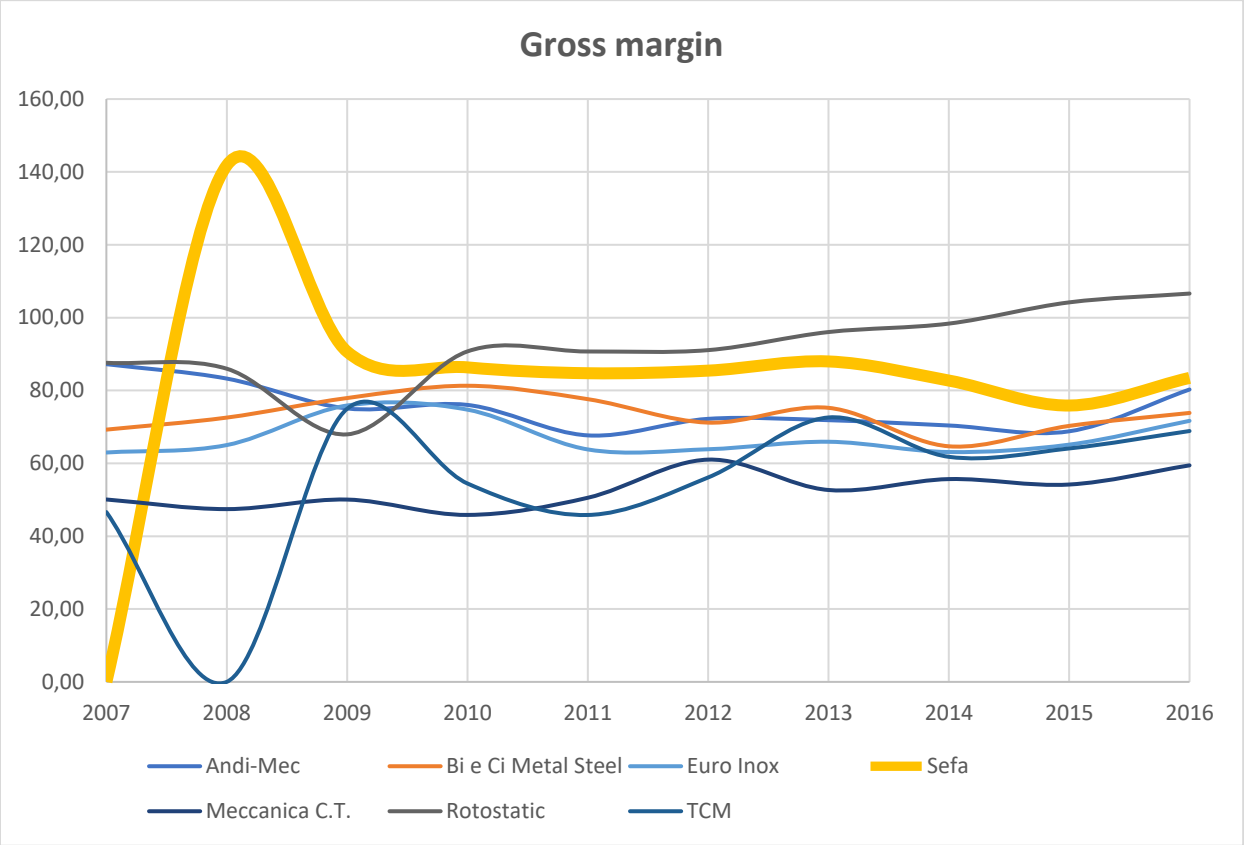
Value of production is augmented considerably (more than forty times), in the first three-years period, reaching the average in the last years, with added value following the same situation. The cost of materials have reached €1 million, less than the average, while costs of employees are almost €2 million and depreciations have augmented through the years too, reaching and exceeding €0.5 million.

P/L results are lower than other ones, but steady a little over the line of the zero.





In brief, indexes follow the same patterns of the value of production, with a positive surge in 2008 and then always a little over the null value. Gross margins are good, more than 80% and a little more than the mean value; stock turnover is very low in 2014 and 2015 but, unfortunately, not available in the other years.



This young company in less than ten years has reached the dimensions and also balanced the results of its older competitors: a new strong enterprise may be is less attached than other ones to its business principles and could try to implement new ones in a more persistent way. Moreover, its good growth and operative results in the last decade signifies that there are the possibilities to continue the improvement in the future.

Officina Ci-Esse S.r.L.

Presentation

Officina Ci-Esse is specialized in the production of complex mechanical components, with the synergy of additive technologies and chip removal (milling, turning and EDM). The company, on the precision mechanics market for over thirty years, operates in the fields of racing and automotive, medical, aerospace and printing. It's ATECO code is 282990, manufacture of general-purpose machinery and other mechanical equipment n.e.c.

The sector

In average, the sector can't claim good results.

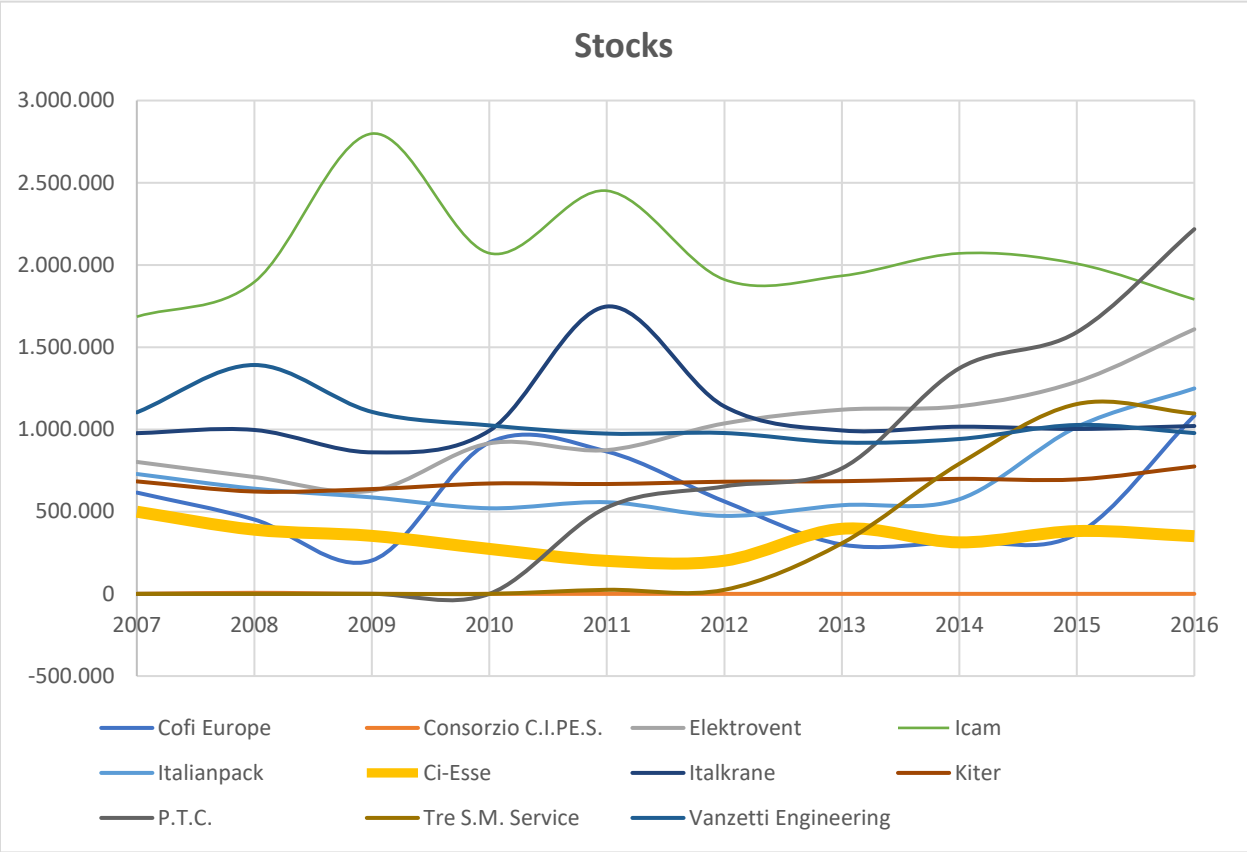
Peer	
Name	282 LA (Large companies)
Description	Manufacture of other general purpose machines
Size	1.696 companies

Competitors

Companies	ATECO code	Description
Cofi Europe	282500	Manufacture of non-domestic use equipment for refrigeration and ventilation; manufacture of fixed domestic conditioners
Consorzio C.I.PE.S.	282910	Manufacture of scales and automatic machines for sale and distribution (including detached parts and accessories)
Elektrovent	282500	Manufacture of non-domestic use equipment for refrigeration and ventilation; manufacture of fixed domestic conditioners
Icam	282209	Manufacture of other machinery and lifting and handling equipment
Italianpack	282930	Manufacture of automatic dosing, packaging and packaging machines (including parts and accessories)
Officina Ci-Esse	**282990**	**Manufacture of general purpose machines and other mechanical material n.e.c.**
Italkrane	282200	Manufacture of lifting and handling machines and equipment
Kiter	282920	Manufacture of machinery and apparatus for chemical, petrochemical and petroleum industries (including parts and accessories)
P.T.C.	282999	Manufacture of other mechanical material and other general purpose machines n.e.c.
Tre S.M. Service	282202	Manufacture of cranes, winches, hand and motor winches, transshipped trolleys, forklifts and revolving platforms
Vanzetti Engineering	282990	Manufacture of general purpose machines and other mechanical material n.e.c.

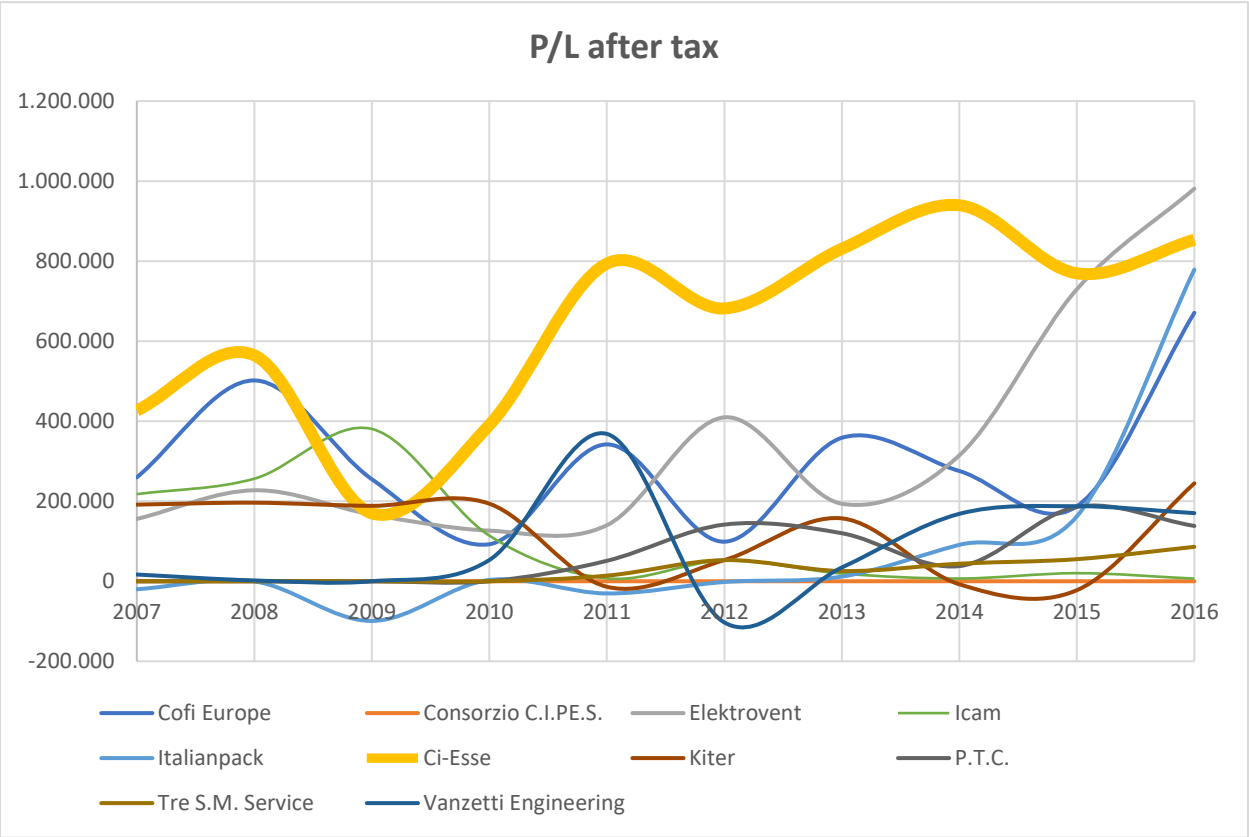
General Comments

Assets in general are risen respecting the medium value in the period considered, with current ones being bigger than non-current ones. Stocks are very low.

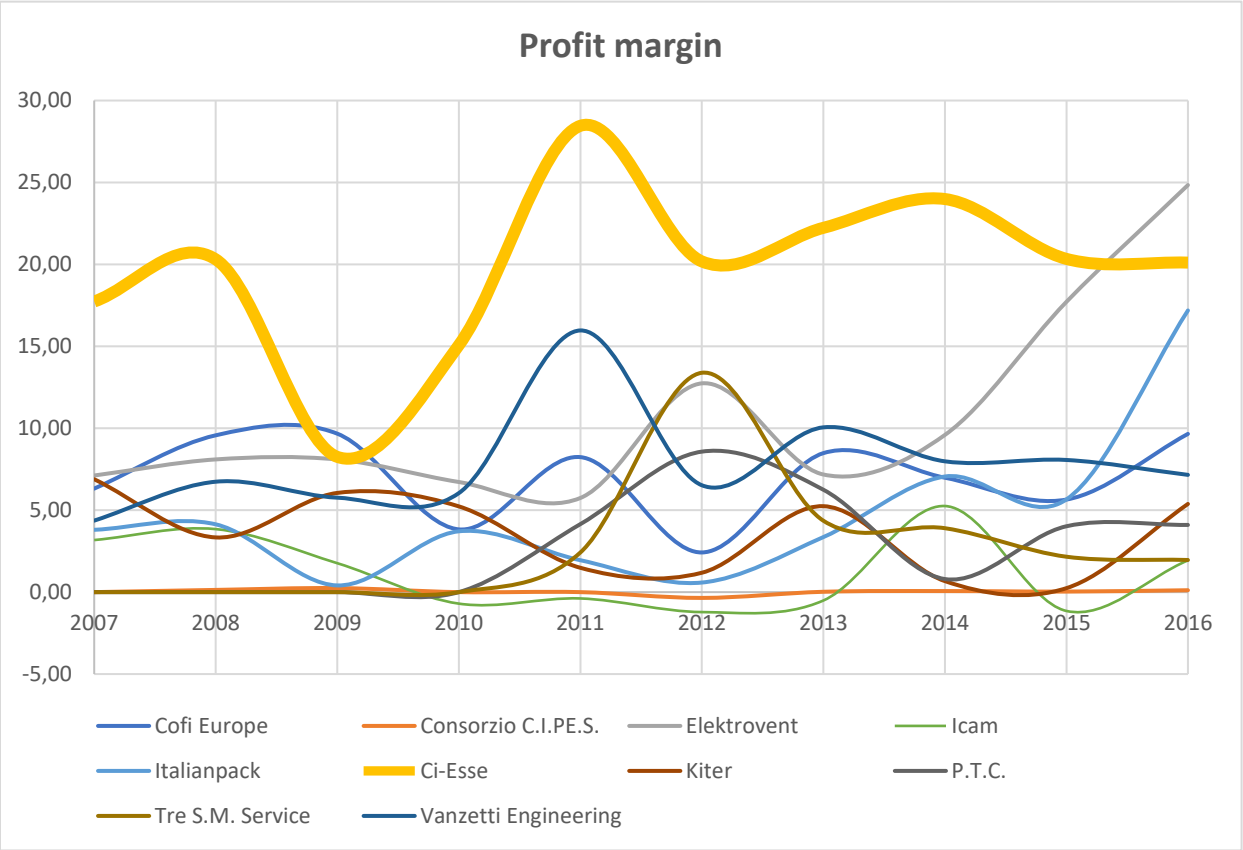


Shareholder funds, after a big augment between 2014 and 2016, are higher than the mean value, with a constant capital of €0.1 million being just above the average. Non-current liabilities are null in the last exercises, whereas current ones are more than €4 million, higher than almost all the rest of the companies.

Value of production is one of the steadier of the peer and, after a negative peak in 2009, is increasing; added value is generally better than the rest of the group. Cost of materials are lower, always under €1 million, employees' ones, instead, respect the average, although the number of persons working for Officina Ci-Esse is a little shorter than it. Depreciations were much higher than average in the past, while now are reaching it. Generally, operating P/L and P/L after taxes are much better than the general situation.



All the indexes considered fluctuate a lot, but always remaining much higher than the rest of the firms, as it seeable below; gross margin overcomes 100% in the last exercises. Unfortunately, no data about stock turnover were available.



To conclude, the company has positive results, better than the rest of the cluster, that put it in an advantage position in its field, allowing the exploration of AM technique in order to gain one more competitive advantage.

Streparava S.p.A.

Presentation

Streparava is today one of the sector leaders and partners of the most important manufacturers in the automotive sector for powertrain components and systems, drivelines, suspensions and engine systems. Its ATECO code is 293209: “manufacture of other parts and accessories for motor vehicles and their engines n.e.c.”.

The sector

Generally, the results of the sector are not good, according to Plimsoll.

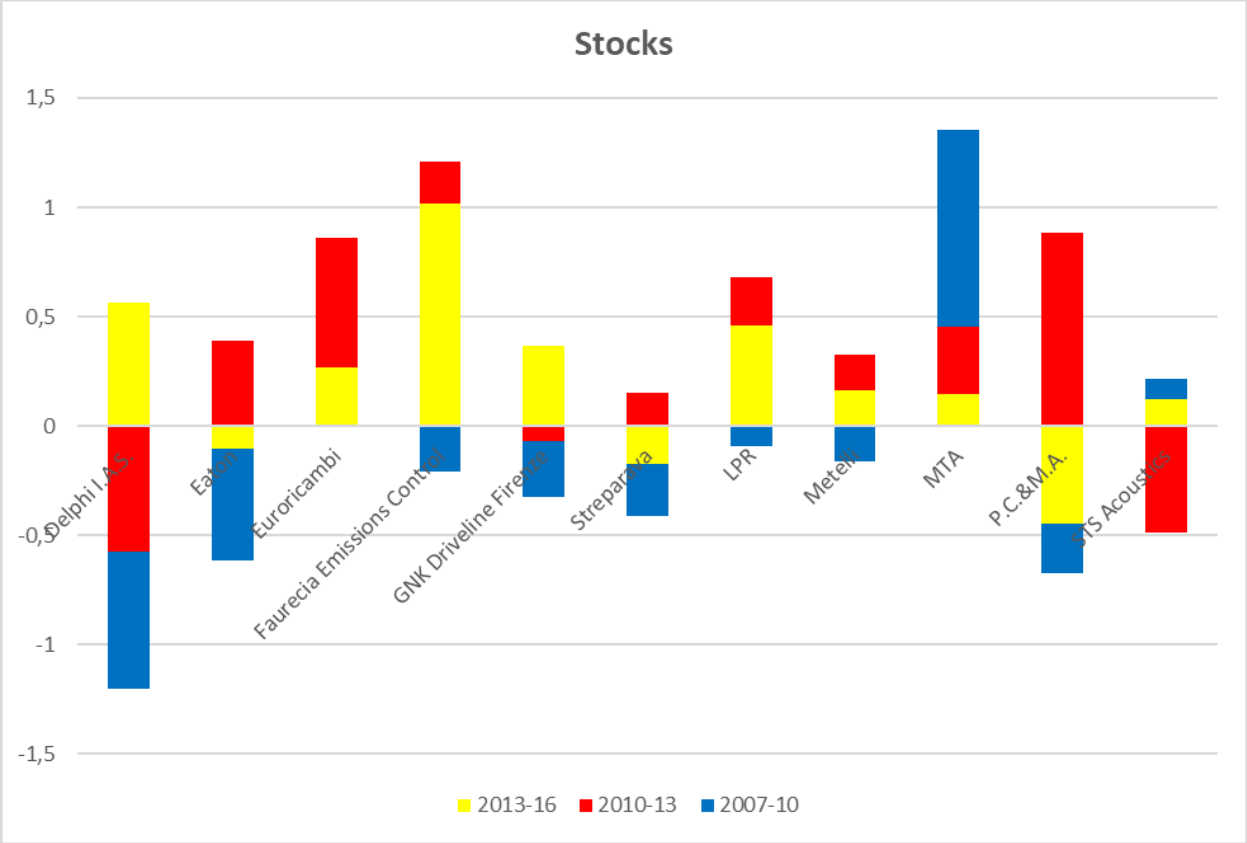
Peer	
Name	293 VL (Very large companies)
Description	Manufacture of parts and accessories for motor vehicles and their engines
Size	135 companies

Competitors

Companies	ATECO code	Description
Delphi Italia Automotive System	293209	Manufacture of other parts and accessories for motor vehicles and their n.e.c. engines
Eaton	293209	Manufacture of other parts and accessories for motor vehicles and their n.e.c. engines
Euroricambi	293209	Manufacture of other parts and accessories for motor vehicles and their n.e.c. engines
Faurecia Emissions Control	293209	Manufacture of other parts and accessories for motor vehicles and their n.e.c. engines
GNK Driveline Firenze	293209	Manufacture of other parts and accessories for motor vehicles and their n.e.c. engines
Streparava	**293209**	**Manufacture of other parts and accessories for motor vehicles and their n.e.c. engines**
LPR	293209	Manufacture of other parts and accessories for motor vehicles and their n.e.c. engines
Metelli	293209	Manufacture of other parts and accessories for motor vehicles and their n.e.c. engines
MTA	293100	Manufacture of electrical and electronic equipment for motor vehicles and their engines
Plastic Components and Modules Automotive	293209	Manufacture of other parts and accessories for motor vehicles and their n.e.c. engines
STS Acoustics	293209	Manufacture of other parts and accessories for motor vehicles and their n.e.c. engines

General Comments

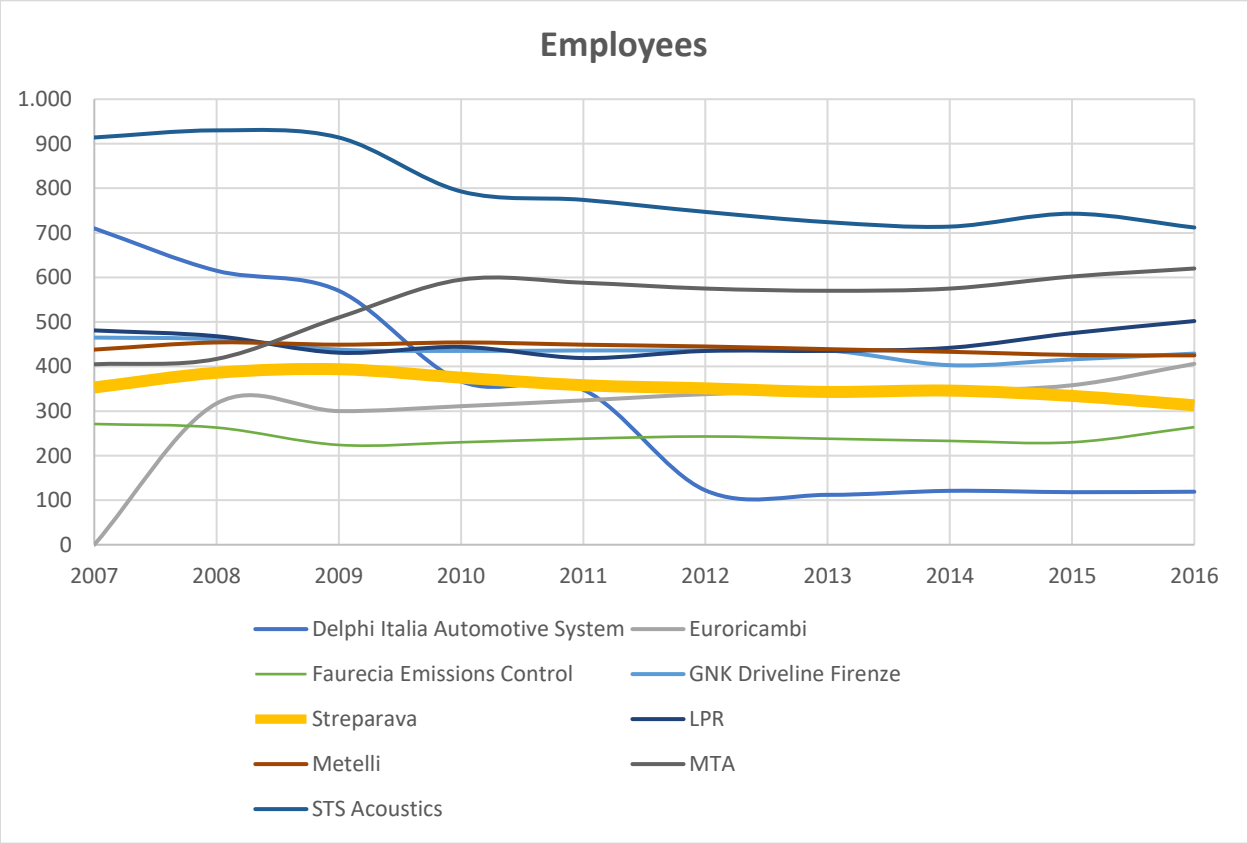
Total assets respect the average, and their changings too: the major part of them is composed by current ones, the highest of the whole group, reaching €130 million, whereas fixed ones, at a €8 million share, are one of the lowest. Stocks are steady between €13 and 14 million, a bit under the medium value.

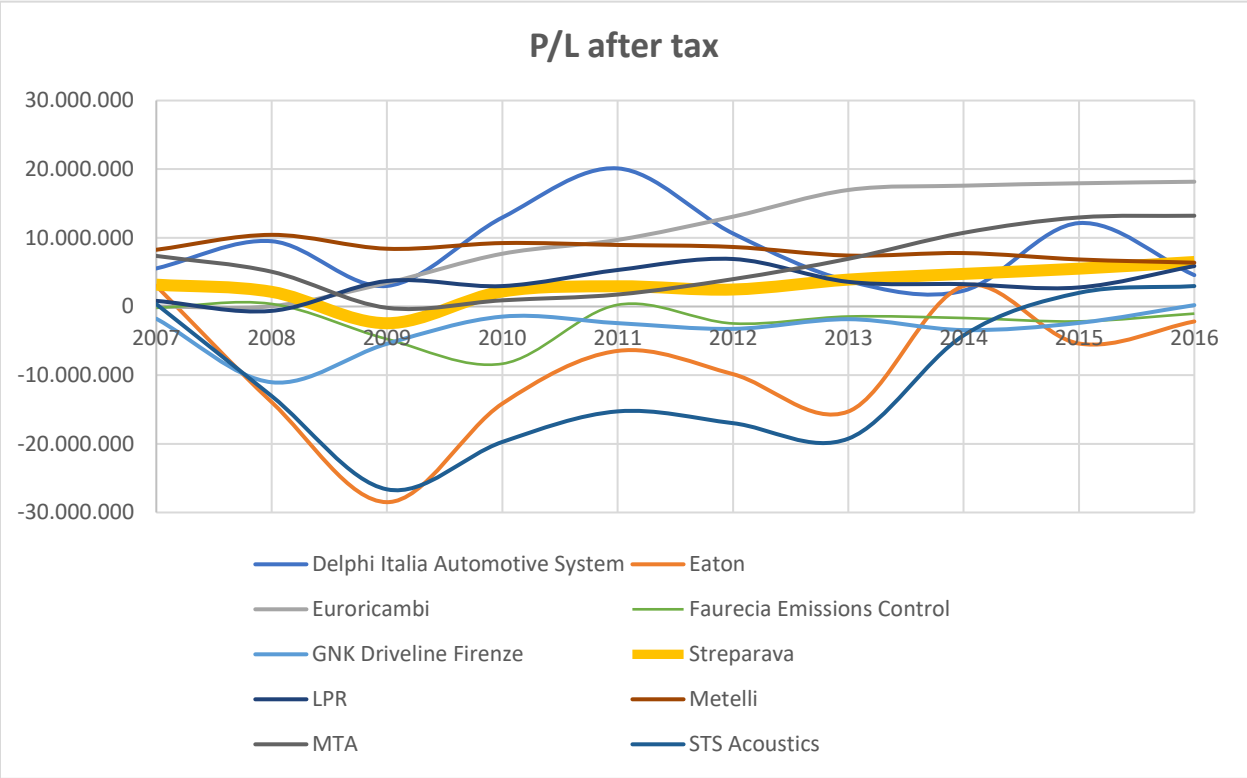


Shareholder funds are in low and steady increase, with the capital stuck at €15 million, a little more than almost all the rest of companies; current liabilities are much higher than non-current ones, around €80 million against 20: the first ones are higher than the mean value, the second ones a little lower.

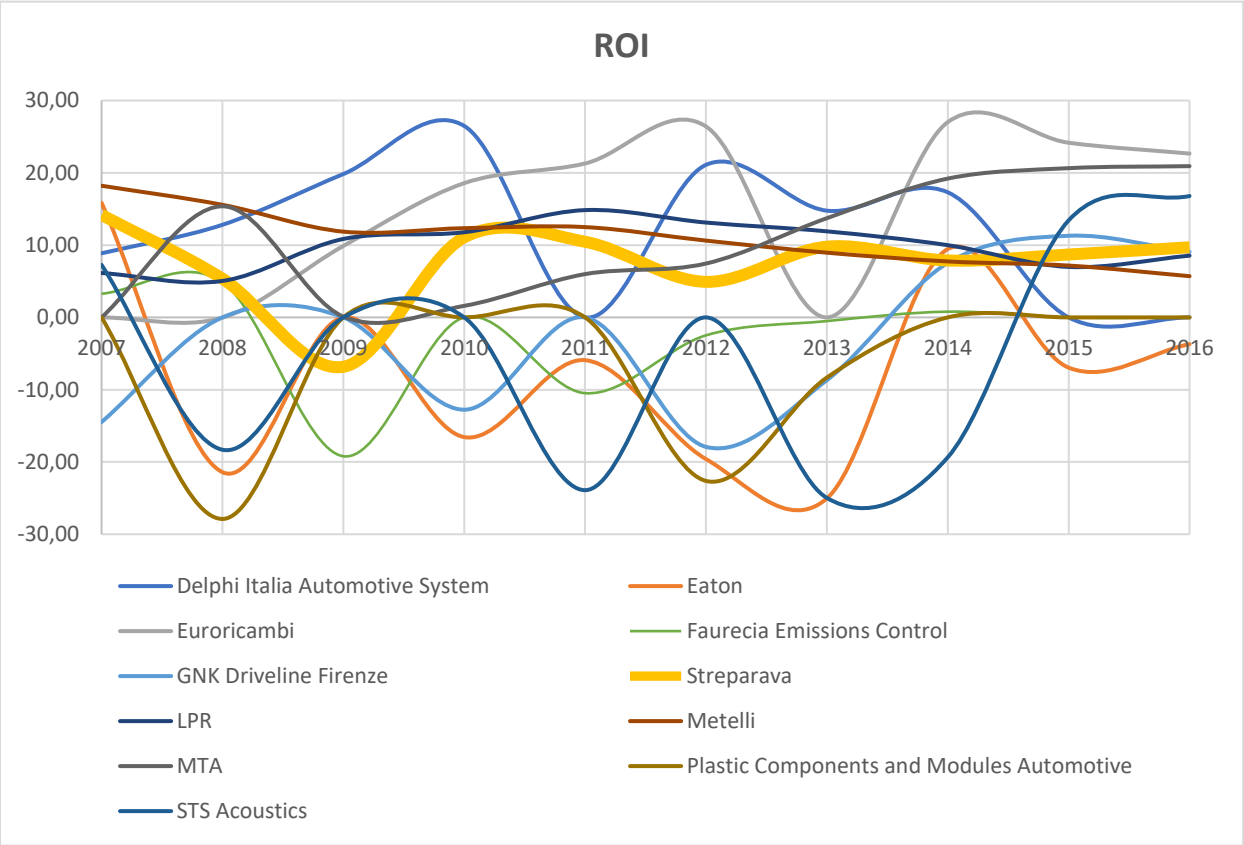
Value of production, after a big collapse between 2008 and 2009, is growing slightly but constantly, reaching the amount of €143 million in the last year; the added value is steady but under the average. Cost of materials are higher than the majority of the peer; on the other hand, employees ones are lower, alongside the number of it. Depreciations, compared to the rest of economic data, are not

significative. P/L results are quite good, with the negative exception of the year 2009.





ROE, ROI, ROA and profit margin follow the same pattern of P/L after taxes, with the negative peak in the same year and over the average results in the other ones; gross margin is under the mean value at around 35%. Stock turnover, at around 30 days, is one of the bests of the peer.



In conclusion, Streparava don't seem more adequate than many other companies of the peer for an exploration and adoption of AM techniques, but its big dimensions and quite good P/L results allow it.

Leone S.p.A.

Presentation

Born from a little artisan activity, is now an affirmed industrial reality, based in Sesto Fiorentino (Florence), specialized in orthodontics and implantology. Its specific ATECO code is 325020: denture manufacturing.

The sector

After the period of crisis, this sector is rapidly raising.

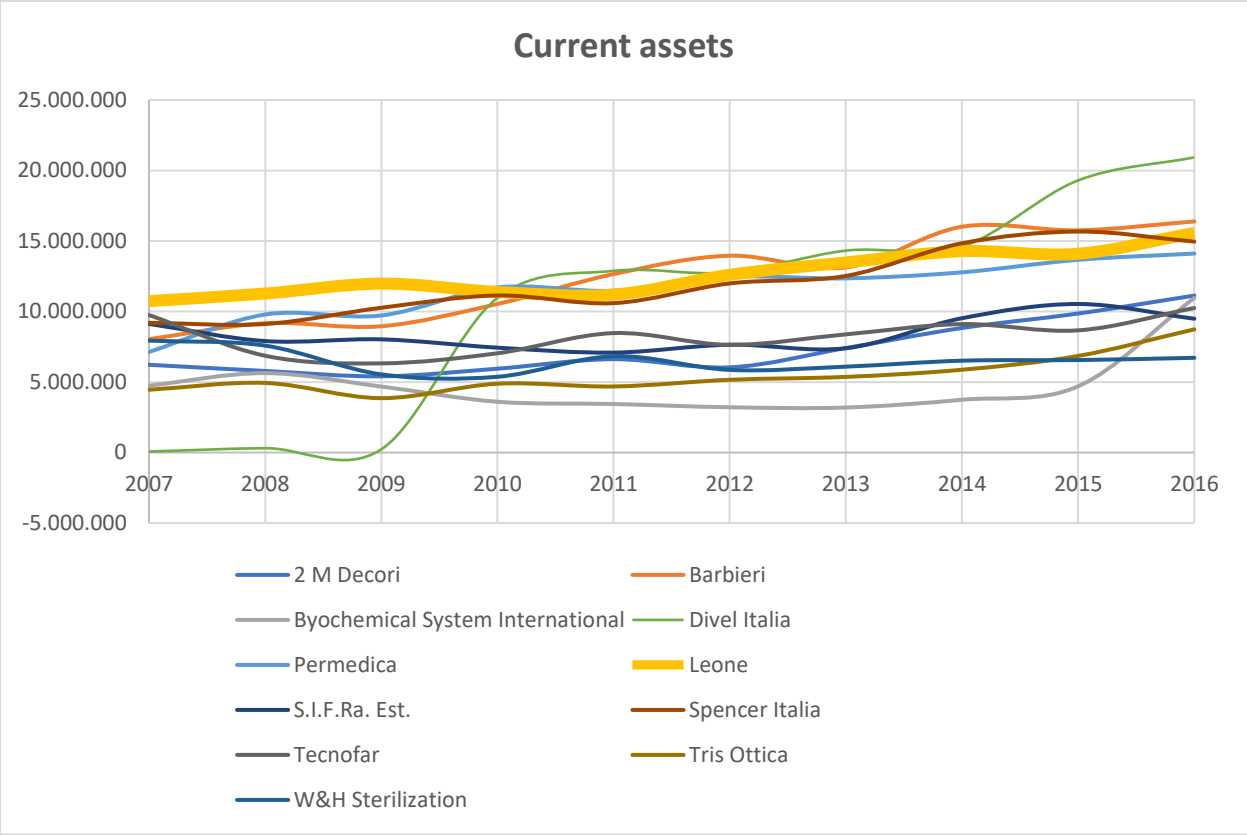
Peer	
Name	325 VL (Very large companies)
Description	Manufacture of medical and dental instruments and supplies
Size	195 companies

Competitors

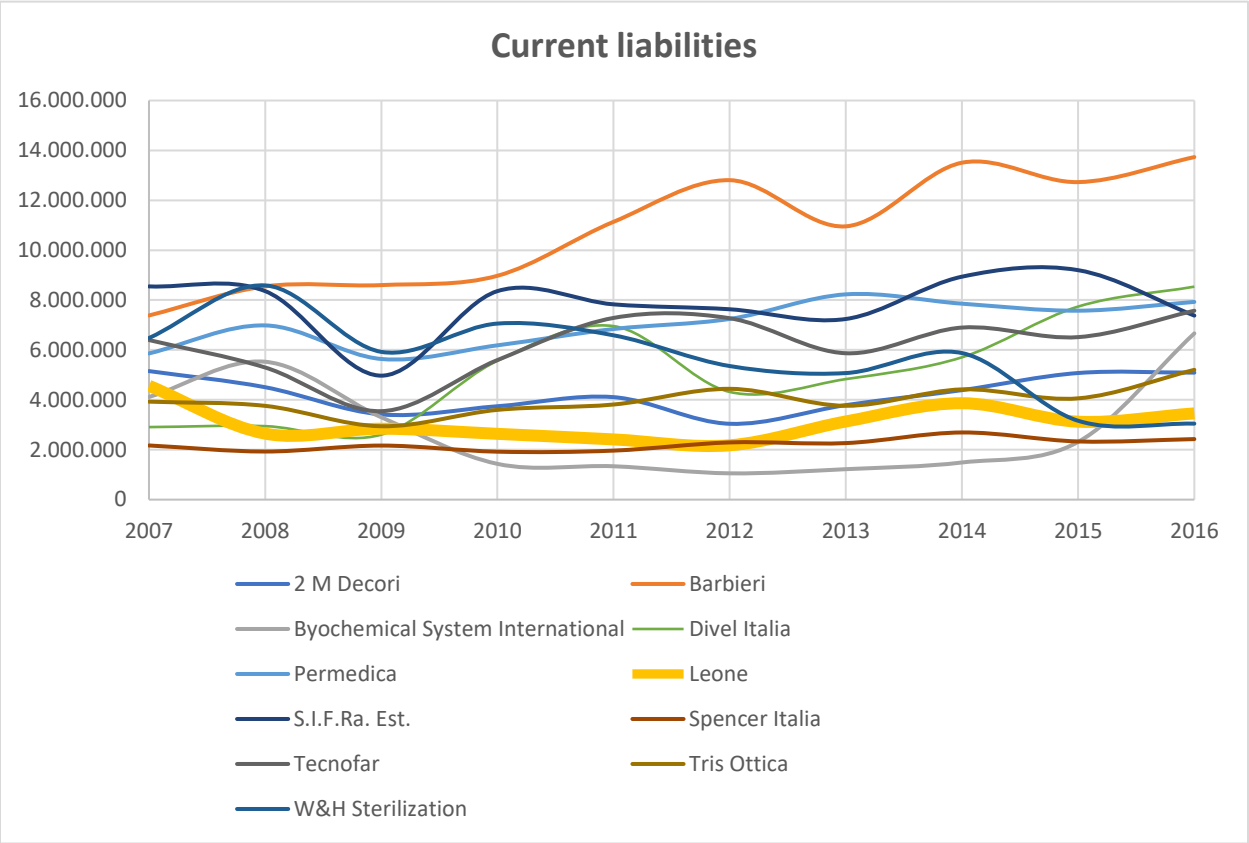
Companies	ATECO code	Description
2 M Decori	325050	Manufacture of eyewear armour of any kind; mounting in a series of common glasses
Barbieri	325030	Manufacture of orthopedic prostheses, other prostheses and aids (including repair)
Byochemical System International	325012	Manufacture of equipment and instruments for dentistry and medical devices for diagnosis (including detached parts and accessories)
Divel Italia	325040	Manufacture of ophthalmic lenses
Permedica	325000	Manufacture of medical and dental instruments and supplies
Leone	**325020**	**Manufacture of dentures (including repair)**
S.I.F.Ra. Est.	325010	Manufacture of medical furniture, medical devices for diagnosis, medical-surgical and veterinary equipment, dentistry equipment and instruments (including detached parts and accessories)
Spencer Italia	325011	Manufacture of medical-surgical and veterinary material
Tecnofar	325011	Manufacture of medical-surgical and veterinary material
Tris Ottica	325050	Manufacture of eyewear armour of any kind; mounting in a series of common glasses
W&H Sterilization	325012	Manufacture of equipment and instruments for dentistry and medical devices for diagnosis (including detached parts and accessories)

General Comments

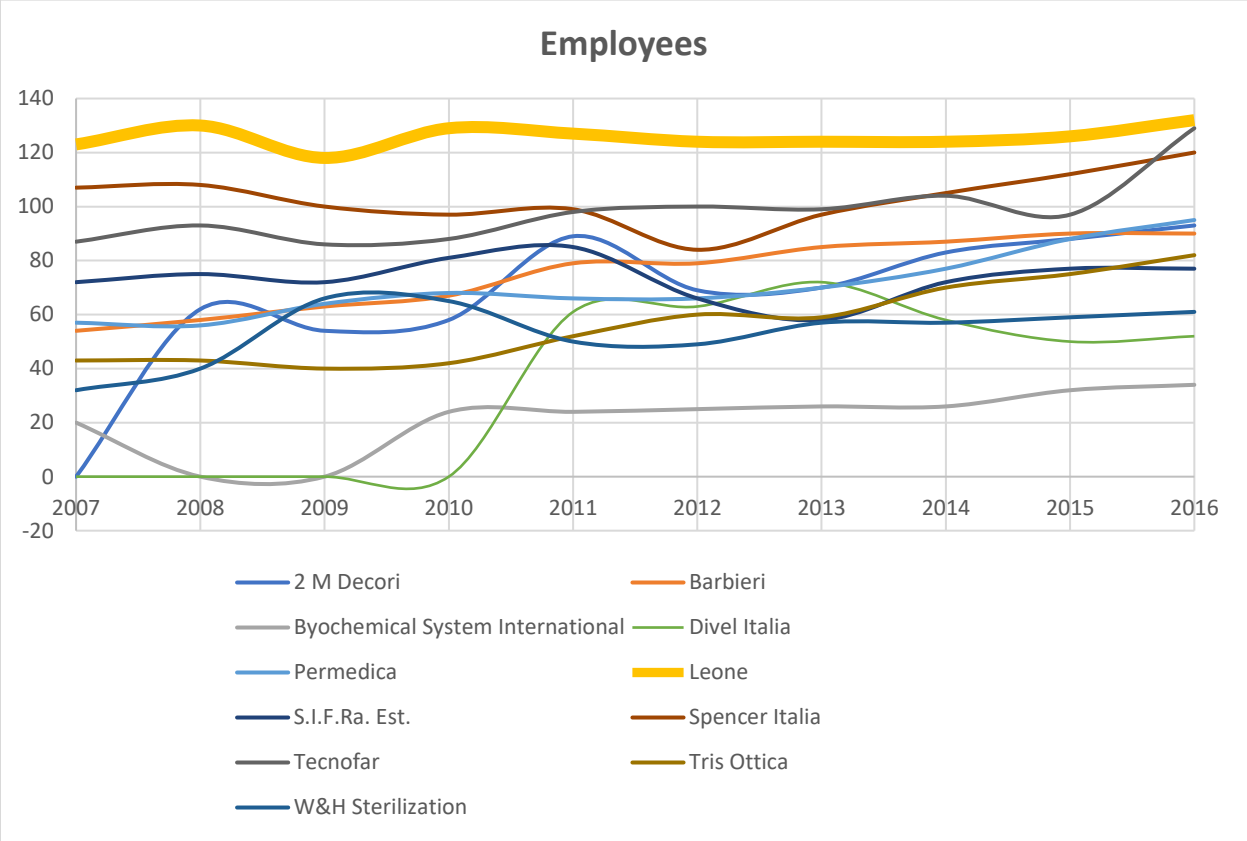
Total assets (a bit less than €18 million) are just above the mean value, with fixed ones being below it (very low intangible assets) and current ones always between the highest ones (and the highest one until 2010). Stocks are very steady, much more than the rest of the sector, and generally bigger than average.

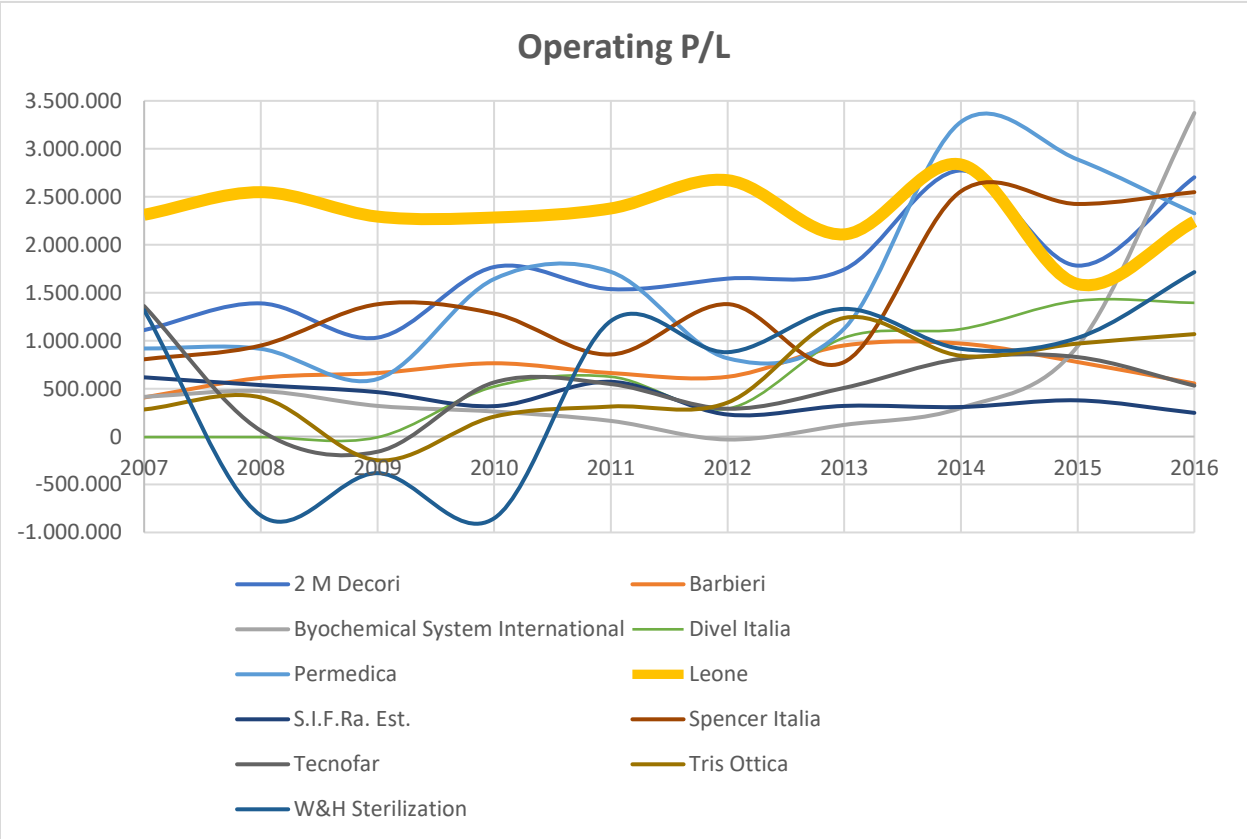


Shareholder funds are, with Spencer Italia, the highest of the peer: capital is stuck at €1.2 million, lower than same other firms' ones, stating that Leone's earnings and reserves situation is, in general, one of the best ones. Non-current liabilities are null since 2013, whereas the majority of the peer use it to finance its business; current ones are one of the lowest too (€3.4 million in the last exercise), making the brand one of the less indebted of the group.

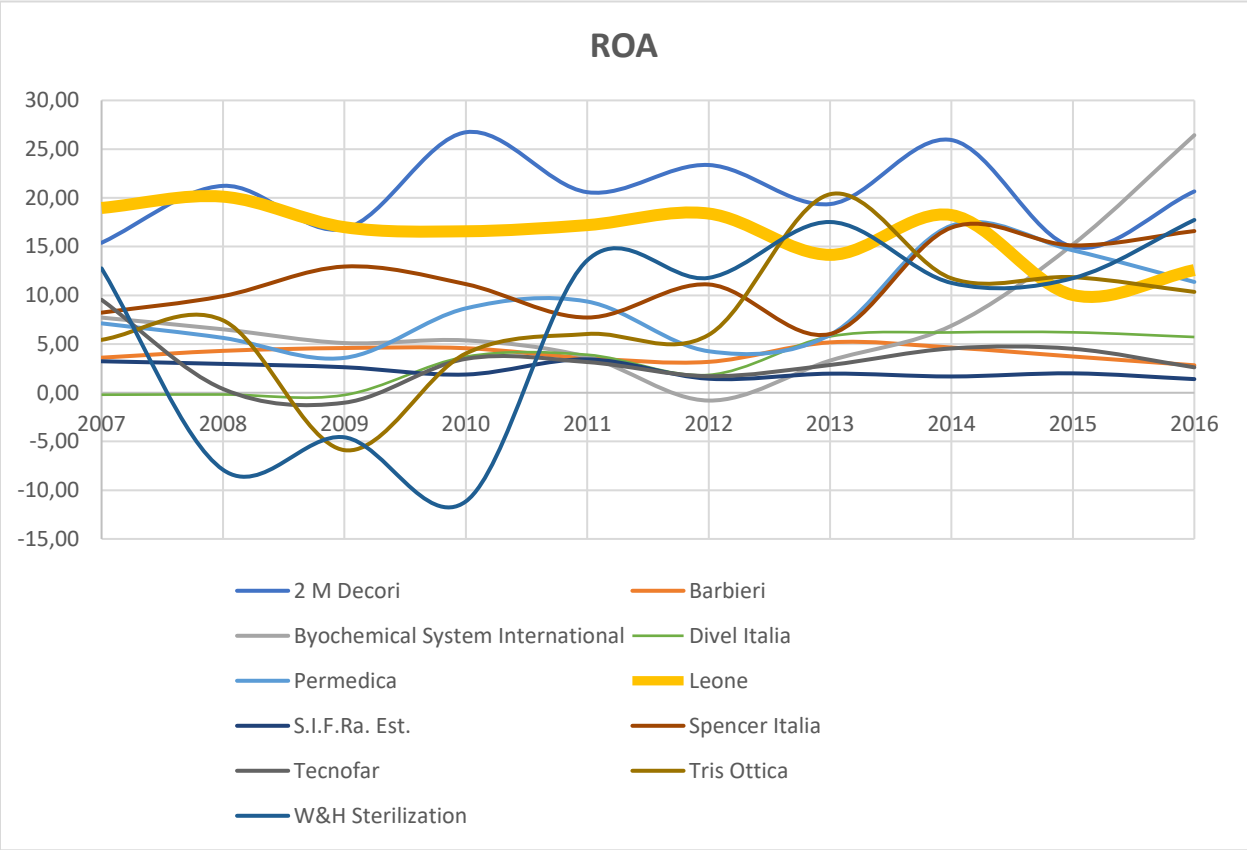


Value of production is one of the steadiest of the total: that's not a good sign because the rate of growth is one of the worst, but is increasing in the last period; on the other side, added value is the better of the peer, constant at €8 million or a little more in the ten years. Costs of materials are the lowest ones and, in the exact contrary, costs of employees the highest ones, according to the number of person employed, which is the bigger one; depreciations are, don't considering the first three years, ones of the lowest of the total. Operative P/L and P/L after taxes are good: they are the best ones until 2013, and then they show good results too.


Employees
140
120
100
80
60
40
20
0
-20
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2 M Decori
Barbieri
Byochemical System International
Divel Italia
Permedica
Leone
S.I.F.Ra. Est.
Spencer Italia
Tecnofar
Tris Ottica
W&H Sterilization


Operating P/L
3.500.000
3.000.000
2.500.000
2.000.000
1.500.000
1.000.000
500.000
0
-500.000
-1.000.000
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2 M Decori
Barbieri
Byochemical System International
Divel Italia
Permedica
Leone
S.I.F.Ra. Est.
Spencer Italia
Tecnofar
Tris Ottica
W&H Sterilization

ROE shows good results: always between 10 and 20% and one of the best ones; ROI is even better but other brands' ones are not disposable to compare; ROA is one of the best too, but in little decrease in the last years. Profit and gross margin are the best of the group, dividing the primacy with W&H Sterilization; in particular, the latter is always fluctuating along the 100% line. Considering stocks turnover, the enterprise is much better than same twins and much worse than other ones.



To conclude, Leone could claim great results both in operative and economic field, being the best enterprise of the peer: that situation gives it the possibility to expand its business channels and try to gain one more advantage through 3DP.

Protesa S.p.A.

Presentation

This company, based in Imola (Bologna), is identified with ATECO code 712010, technical testing and analysis. There are three main areas in which Protesa focuses: quality, from the geometric and dimensional testing of parts and groups, to the calibration and management of measuring instruments, thanks to the testing and calibration room in which Protesa equips itself; production, with services aimed at workshop and the entire production department; engineering with the design and industrialization of groups and machines, prototype construction and consulting on the Machinery Directive.

The sector

Further information were not available.

Peer	
Name	712 VL (Very large companies)
Description	Testing and technical analysis
Size	396 companies

Competitors

Companies	ATECO code	Description
Axist	712010	Testing and technical analysis of products
Bioagricert	712000	Testing and technical analysis
Dekra Testing and Certification	712021	Controllo di qualità e certificazione di prodotti, processi e sistemi
E.L.T.I.	712021	Quality control and certification of products, processes and systems
Eurocert	712010	Testing and technical analysis of products
Protesa	**712010**	**Testing and technical analysis of products**
Labio	712010	Testing and technical analysis of products
Laser Lab	712010	Testing and technical analysis of products
Sider Test	712010	Testing and technical analysis of products
Suolo e Salute	712021	Quality control and certification of products, processes and systems

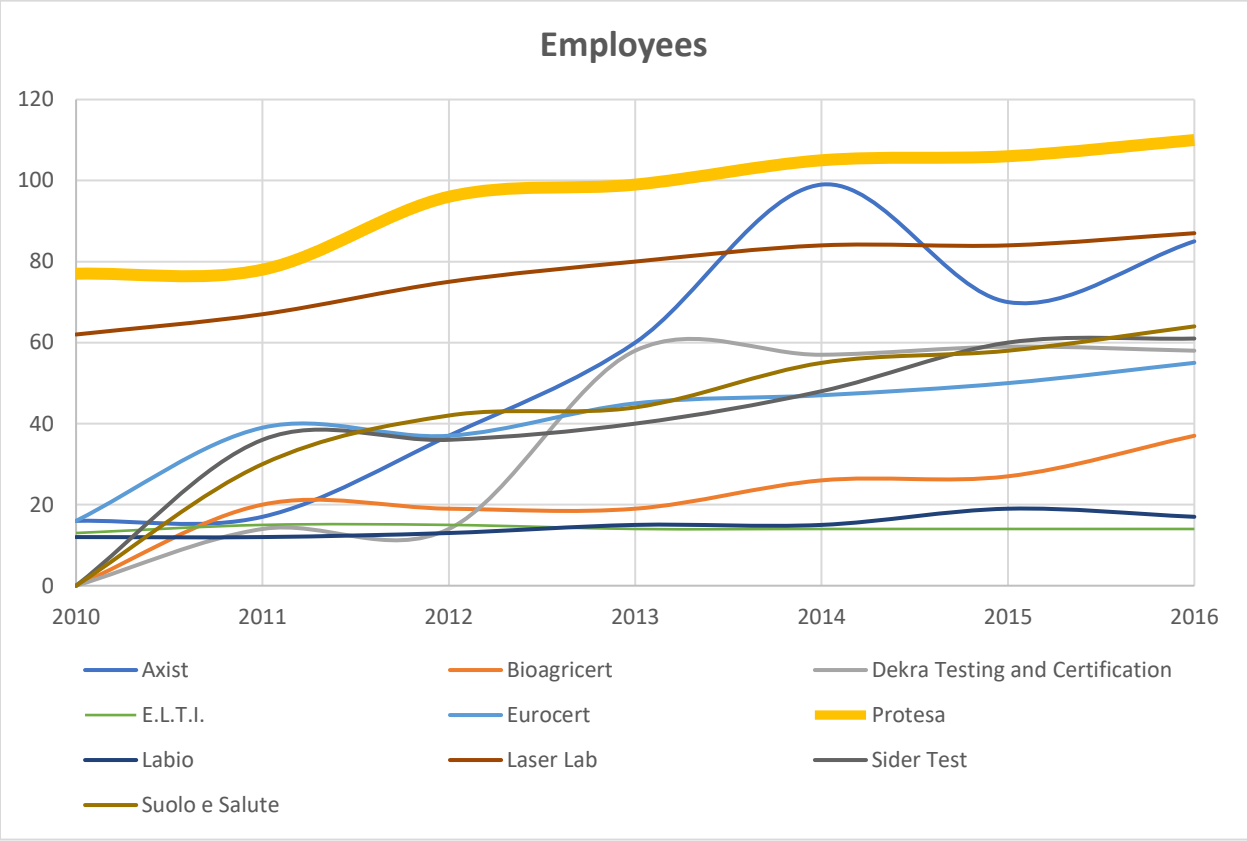
General Comments

Assets in general are very variable: total ones, after a huge positive peak between 2010 and 2012, are decreased reaching the average; basing on fixed ones, they are very low, especially in the last years, being below €0.4 million; current ones are the cause of the peak and now they are reducing. On the other hand, the amount of stocks is the highest one of the peer and one of the few not near to the line of the zero.

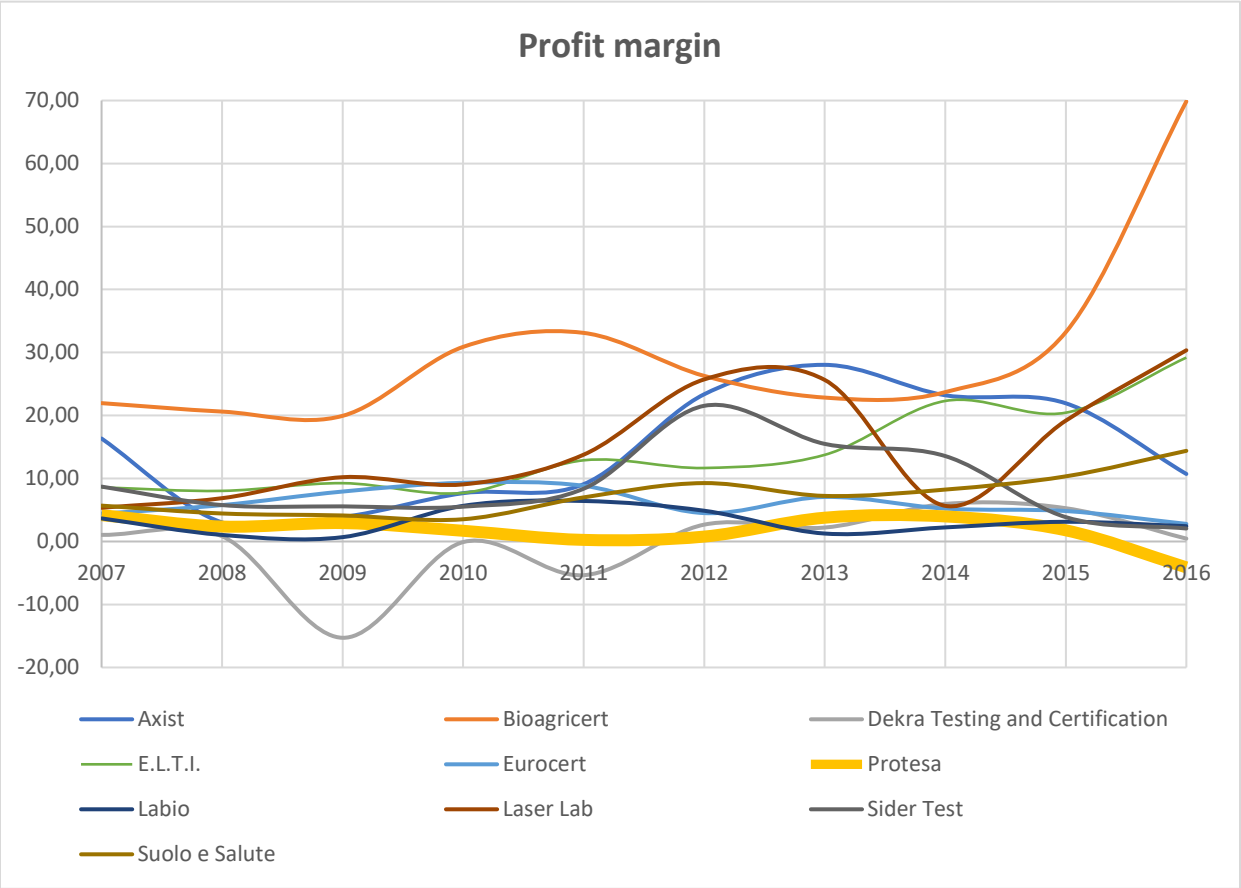
Shareholder funds are not big: they are one of the lowest of the group, with a capital steady at €120,000. The firm prefers current liabilities to non-current ones (2015 is the unique year in which this item of balance is important).

Value of production is now around €9 million, the best of the total for a few thousands euros, but in the past, between 2010 and 2012, reached even €17 million;

on the other side, added value shows, in addition to one of the best results, a constant growth through the years. Costs of materials are low, under €1 million in the last exercise, but the average of the sector is terribly shorter; costs of employees are ones of the highest, in line with the number of employees which is the taller of the cluster. Depreciations are low and not important. P/L results are not so good: operative one is negative in the last year, whereas P/L after taxes is always just a few thousands over the break-even line.



Indexes results in general are not exceptional, with ROE always positive and under 10% and ROE, ROA and profit margin with a negative value in the last year. Gross margin data of the peer are very good, with Protesa occupying the last position with an average of 50%.



To end, Protesa can't boast better results than its cluster, on the contrary of the majority of the brands previously analyzed, but its dimensions and good results in some single exercises, joined to the important role which AM could play in the sector, encourage the exploration and the adoption of it.

Rina Consulting S.p.A.

Presentation

Rina Consulting, with over two hundred talented researchers and technicians, twenty laboratories, pilot lines and full scale testing facilities, is the partner of choice for any project in which materials, technology and innovation play a critical role. It offers R&D and consulting projects to its Clients, providing full support in product and process innovation, covering all aspects from metallurgical design of special

steels and alloys to the development and optimization of manufacturing processes. It validates its solutions from laboratory scale to pilot plant and full scale, considering the design of special testing equipment whenever needed as well as the optimization of environmental impact of the products and processes in which they are involved.

The sector

Further information were not available.

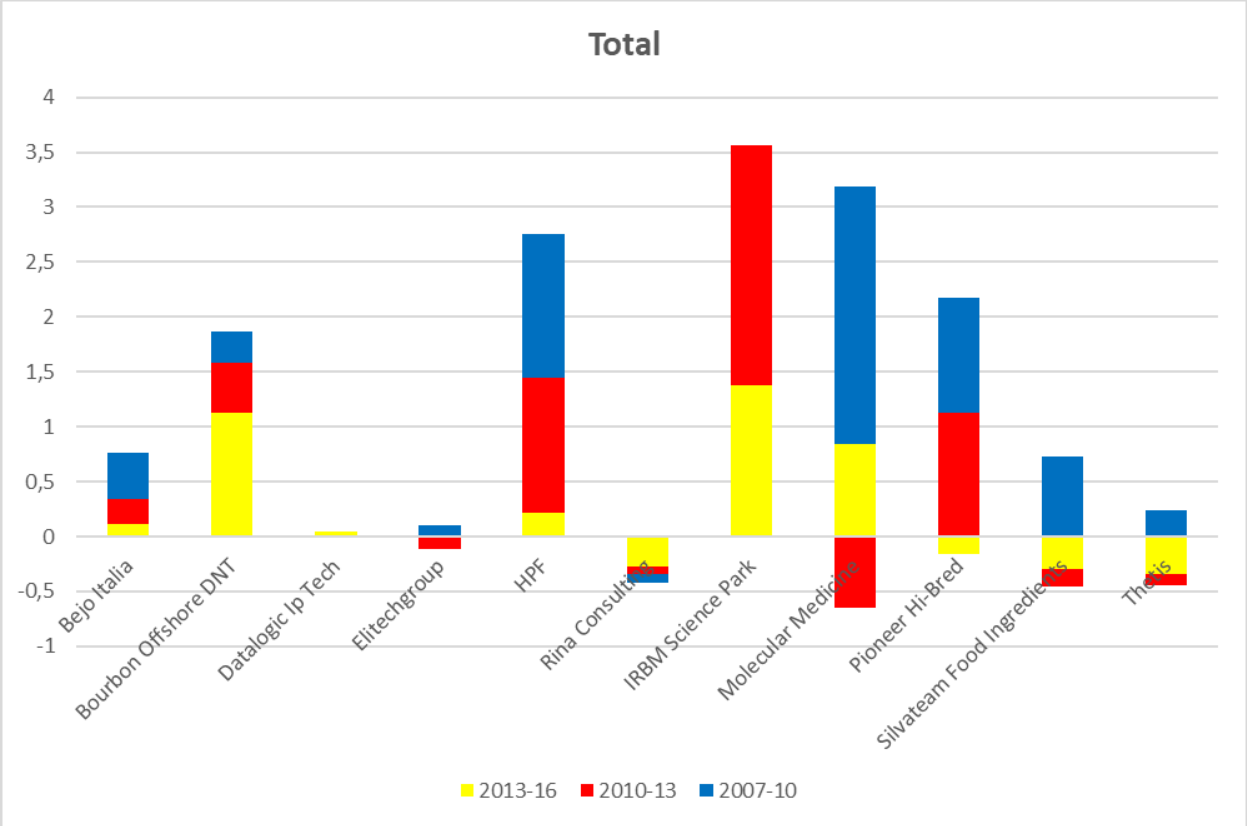
Peer	
Name	721 VL (Very large companies)
Description	Research and experimental development in the field of natural sciences and engineering
Size	409 companies

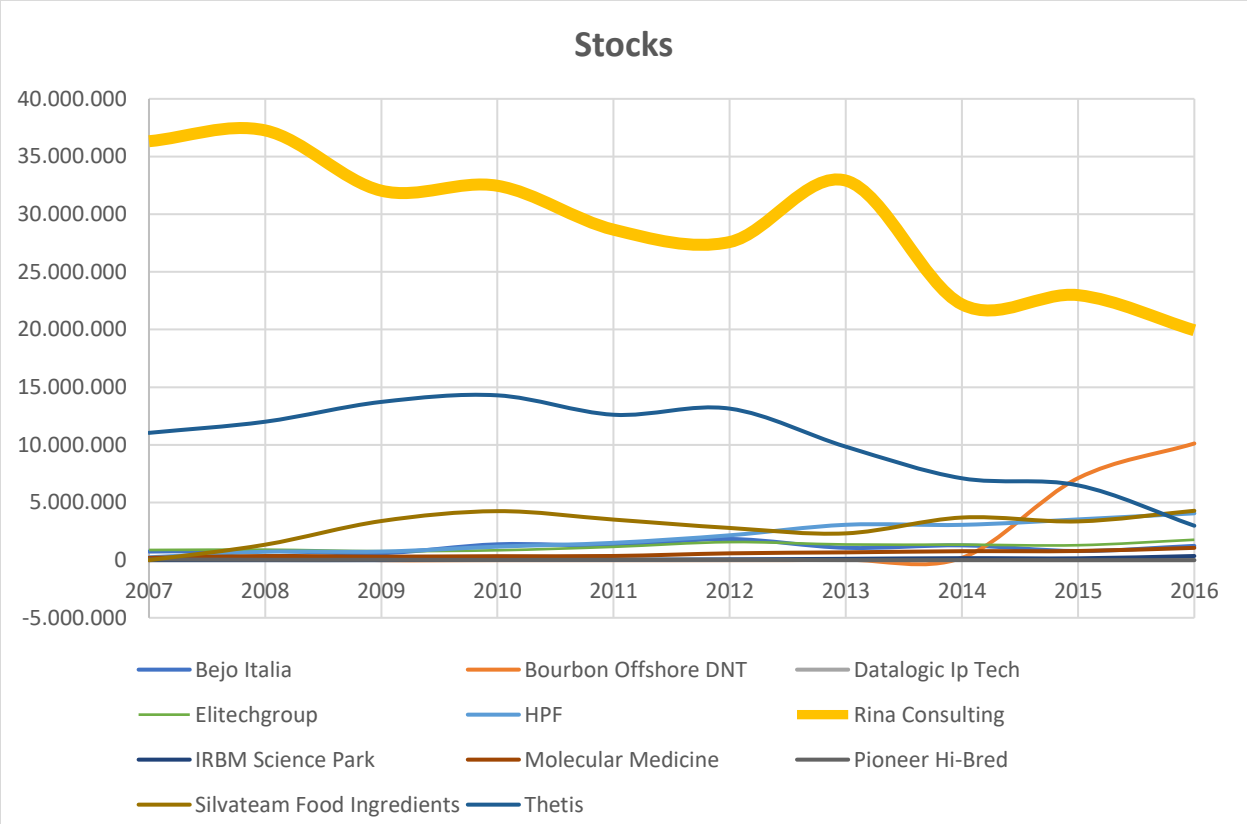
Competitors

Companies	ATECO code	Description
Bejo Italia	721909	Research and experimental development in the field of other natural sciences and engineering
Bourbon Offshore DNT	721000	Research and experimental development in the field of natural sciences and engineering
Datalogic Ip Tech	721909	Research and experimental development in the field of other natural sciences and engineering
Elitechgroup	721000	Research and experimental development in the field of natural sciences and engineering
HPF	721909	Research and experimental development in the field of other natural sciences and engineering
Rina Consulting	**721000**	**Research and experimental development in the field of natural sciences and engineering**
IRBM Science Park	721000	Research and experimental development in the field of natural sciences and engineering
Molecular Medicine	721000	Research and experimental development in the field of natural sciences and engineering
Pioneer Hi-Bred	721000	Research and experimental development in the field of natural sciences and engineering
Silvateam Food Ingredients	721909	Research and experimental development in the field of other natural sciences and engineering
Thetis	721909	Research and experimental development in the field of other natural sciences and engineering

General Comments

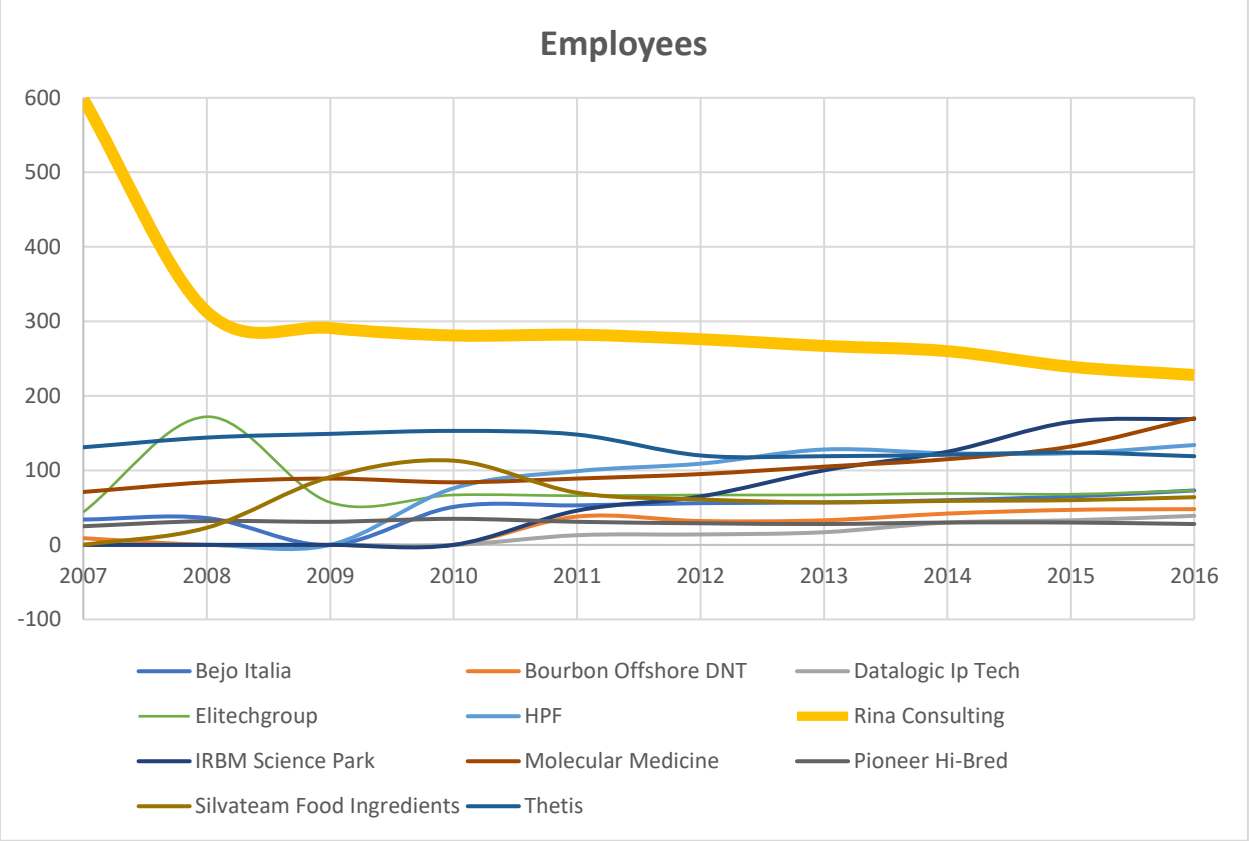
Total assets are the tallest ones of the group, but in net decrease in the last years and reaching the average, with fixed ones dropping seriously down and current ones slightly declining in the last two exercises: more in details, the firm has a good amount of intangible assets over the fixed ones (€1.6 on a total of €7.2), meaning that they are investing hardly in licenses and patents. Stocks are very high, but they are falling constantly in the last period.

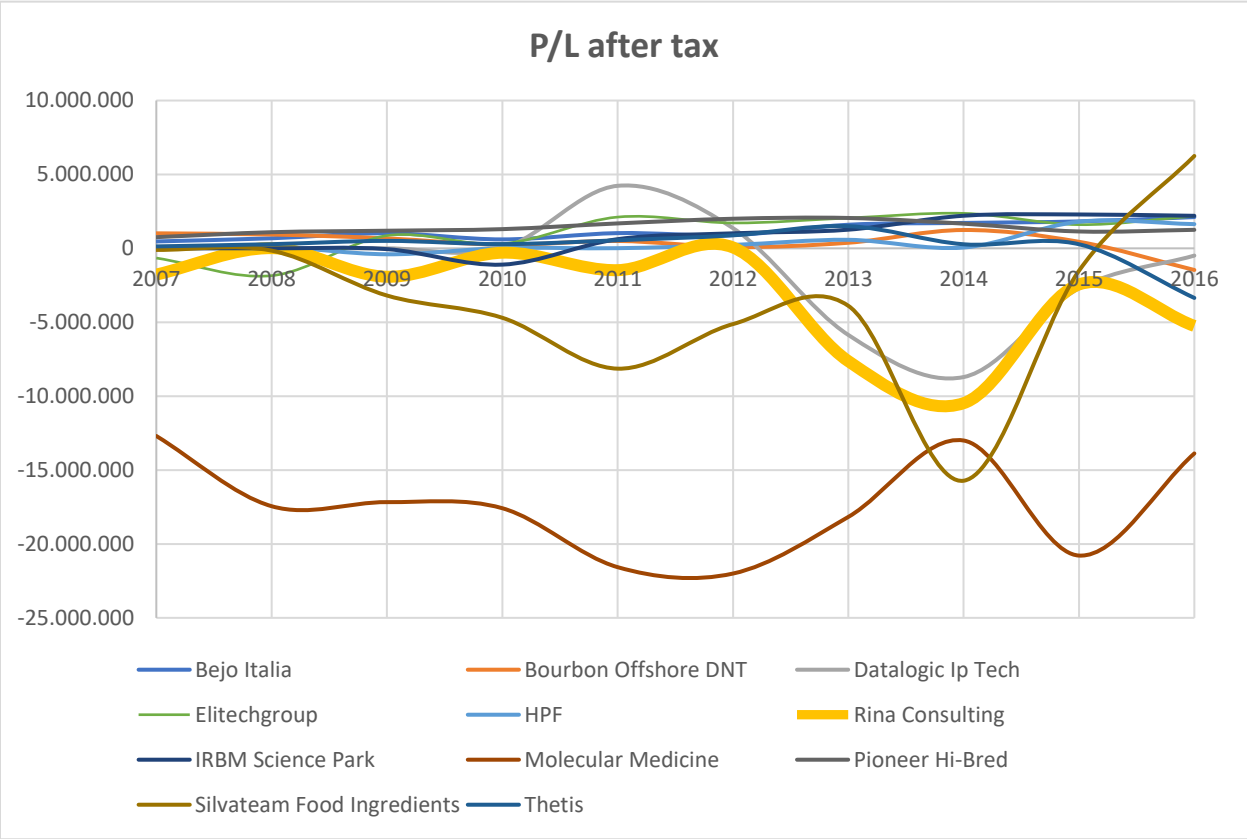

Total
4
3,5
3
2,5
2
1,5
1
0,5
0
-0,5
-1
Bejo Italia
Bourbon Offshore DNT
Datalogic Ip Tech
Elitechgroup
HPF
Rina Consulting
IRBM Science Park
Molecular Medicine
Pioneer Hi-Bred
Silvateam Food Ingredients
Thetis
2013-16
2010-13
2007-10


Stocks
40.000.000
35.000.000
30.000.000
25.000.000
20.000.000
15.000.000
10.000.000
5.000.000
0
-5.000.000
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Bejo Italia
Bourbon Offshore DNT
Datalogic Ip Tech
Elitechgroup
HPF
Rina Consulting
IRBM Science Park
Molecular Medicine
Pioneer Hi-Bred
Silvateam Food Ingredients
Thetis

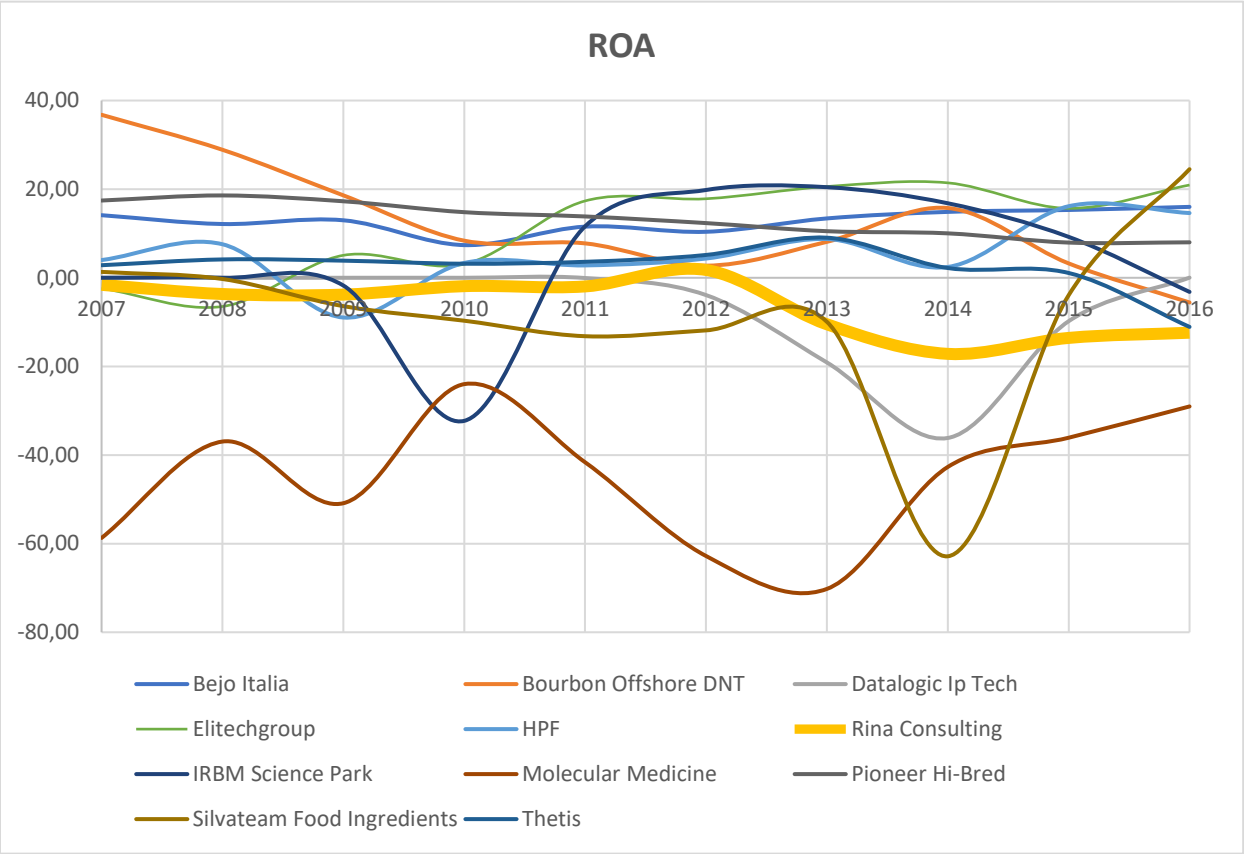
Shareholder funds are very variable, and generally decreased in the last periods and now lower than the mean value: the enterprise has decided to augment its capital from €0.5 million to €1 million. Non-current liabilities are declined from an amount of €10 million in 2007 to one of €1 million in 2016, reaching the null two years before; current ones are decreased too and gone down €40 million for the first time in the last ten years. In general the sector is relatively more turbulent than Rina Consulting, concerning the liability and net equity.

Value of production is decreased through the years, arriving at €21 million, with a general augment for the other companies analyzed, with added value considerably falling too and now around the medium point. On the other side, costs of materials are diminished too and are steady below €2 million; costs of employees are the highest of the peer, €12 million, as the number of them; depreciations are ones of the bigger, reaching and overcoming €3 million last year. P/L results are not good, with a P/L after taxes negative for more than €5 million in the last exercise.





Unfortunately, just a few data of ROE and ROI were available, while ROA and profit margin confirm the same evolution of P/L after taxes. Gross margin was one of the highest in the past, but now is a bit less under the average. Stock turnover data were incredibly bad, with a value of 352 days in the last exercise, whereas the average is seven times smaller.



To conclude, Rina Consulting doesn't show good results in every item, but it's important to state that its field is the one of research and experimental development, less reliable than other ones for the purposes of this work.

Conclusions about the users

To sum up, this category's firms can claim quite good results and good capabilities in more than half of the cases. More in details, it's important to state that two items, much more than the other ones, follow a specific trend: stock level is usually in the lowest positions and added value in the better ones: this two balance sheet data, among the other things and especially the second one, signify that these companies usually plan and organize well their productive chains: this leads to good potentialities, and so to an higher possibility to charge the risk to begin the exploration or even adoption of a new disruptive technologies. On the other hand,

there weren't so many big and latest improvements and trends that, for hypothesis, could be attributed to the use of AM.

As in the case of the producers, this analysis says more about the allowing conditions of additive manufacturing than about its effects (or because there aren't, or because the adoption is too much recent).

Re-Sellers

Seltek S.r.L.

Presentation

Seltek, based in Udine, is one of the best authorized 3D Systems reseller in Italy, indeed they have been dealing with 3D printing and rapid prototyping for over fifteen years, so they are one of the first movers in the country. Their specific ATECO code is 289999: "manufacturing of other machines for special uses".

The sector

Further information were not available.

Peer	
Name	289 ME (Medium companies)
Description	Manufacture of other special use machines
Size	1.636 companies

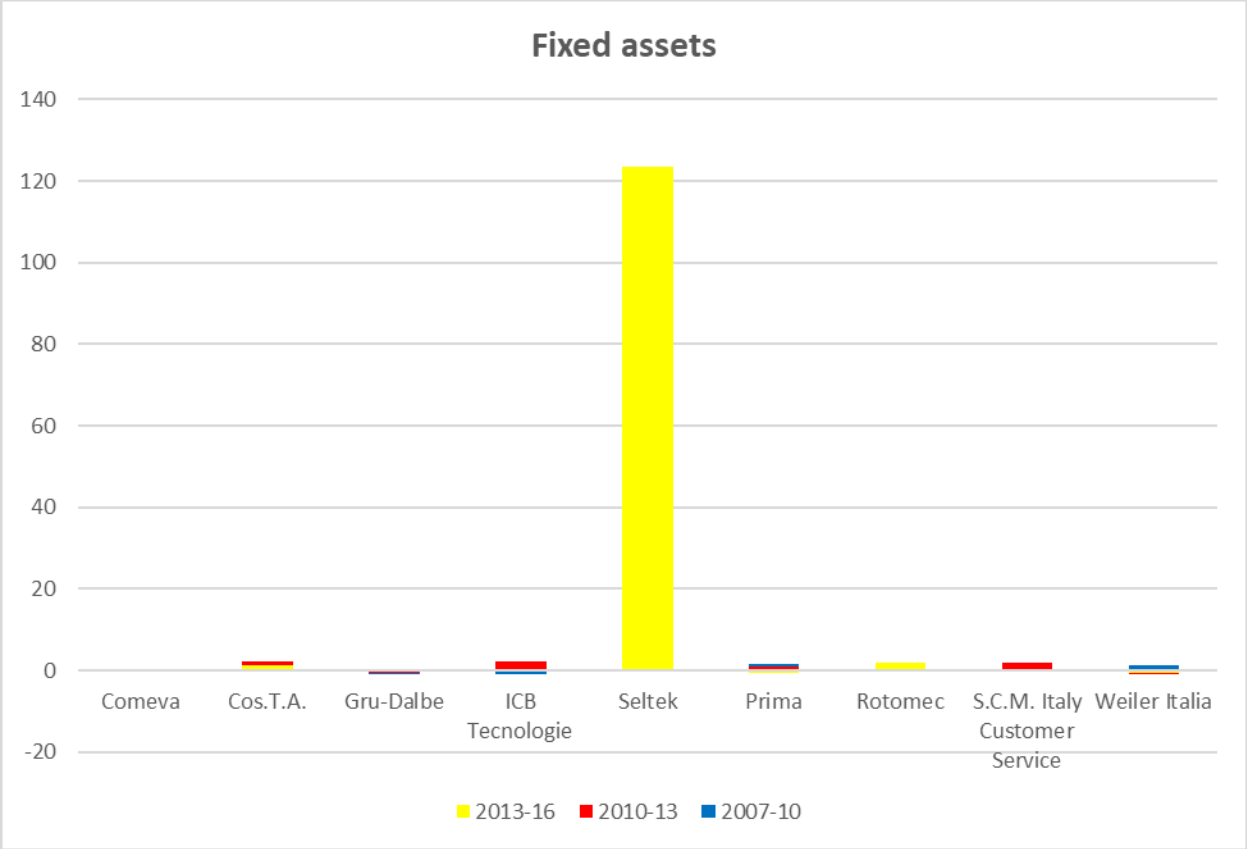
Competitors

Companies	ATECO code	Description
Comeva	289209	Manufacture of other mining, quarrying and construction machines (including parts and accessories)
Cos.T.A.	289410	Manufacture of textile machineries, machines and equipment for the auxiliary treatment of textiles, sewing and knitting machines (including parts and accessories)
Fima	289300	Manufacture of machinery for the food, beverage and tobacco industry (including parts and accessories
Gru-Dalbe	289209	Manufacture of other mining, quarrying and construction machines (including parts and accessories)
ICB Tecnologie	289300	Manufacture of machinery for the food, beverage and tobacco industry (including parts and accessories
Seltek	**289999**	**Manufacture of other special use machines n.e.c. (including parts and accessories)**
Prima	289430	Manufacture of equipment and machines for laundries and ironing (including parts and accessories)
Rotomec	289420	Manufacture of machinery and equipment for the leather, cowhide and footwear industry (including parts and accessories)
S.C.M. Italy Customer Service	289500	Manufacture of machines for the paper and cardboard industry (including parts and accessories)
Weiler Italia	289209	Manufacture of other mining, quarrying and construction machines (including parts and accessories)

General Comments

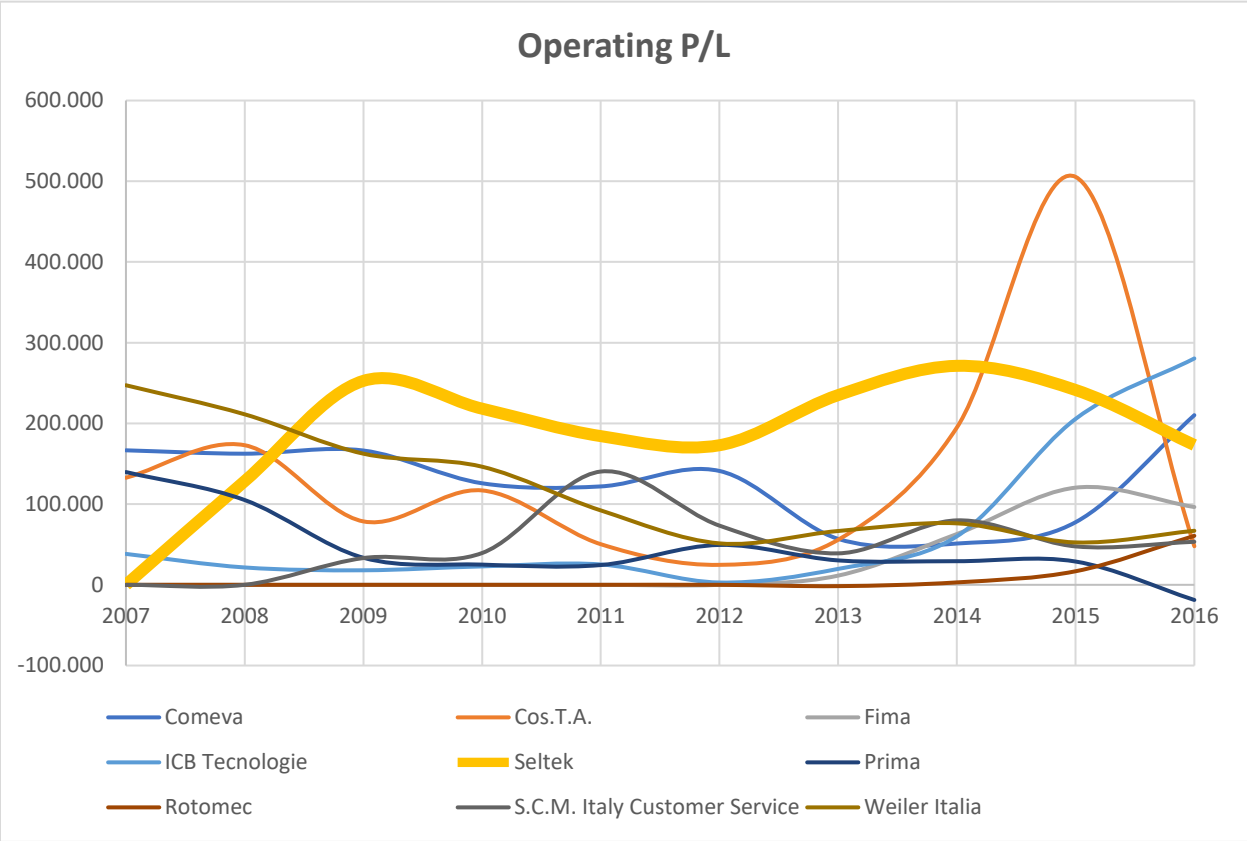
Total assets are generally low and always around €1 million until the last two years: in that period they doubled, passing from the lowest position to the higher ones in the peer: more in details, fixed assets passed from €103,000 to €640,000 between 2015 and 2016, with a total augment of more than one hundred and twenty times in the three years period: an incredible increase for a generally decreasing item; the majority of them for Seltek is represented by financial fixed assets, because intangible ones are always null and tangible ones are almost null; current assets are slightly rising more than the mean value and they respect it. Stocks are boosting

more than almost all the rest of the sector, especially in the last year, becoming one of the biggest of the group.

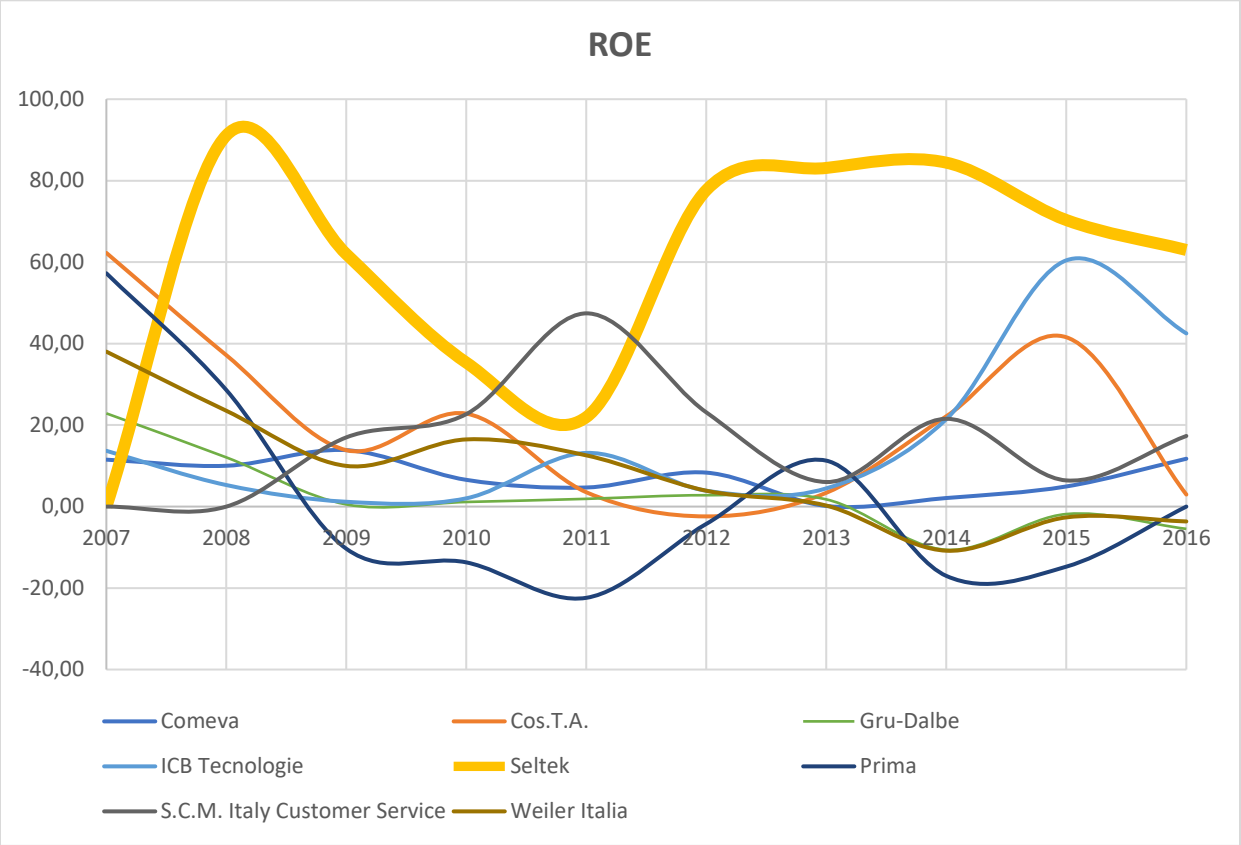


Shareholder funds are fairly steady in the last years, with a very small decline and below the average: capital is stuck at €10,000, one of the lowest of the entire cluster; the company doesn't use non-current liabilities to fund its business and the current ones are generally around the mean value, but the highest ones in the last exercise.

Value of production has known a weak rise in the last ten years, more than the medium rate of its sector, reaching €2.3 million, with added value being one of the lowest but not so below the average at less than €0.2 million (in little decrease). Costs of materials are generally around the mean value, slightly above it in the last year, while cost and number of employees are null in the last years. Depreciations are very low too, always less than €2.000 and the shorter of the total. P/L results are not incredible but always over the break-even line and almost over all the other firms of the peer.



ROE, due to the few capital Seltek possesses, shows very good results, being always over the 60% in the last five years; ROI results are not available, whereas ROA ones are always ones of the best but under 20% and profit margin has similar trends. Gross margin, between 30 and 40%, is almost always the shorter of the group. Stock turnover is not available.



To sum up, Seltek has good results that put itself in a stronger position, compared to the majority of the other brands of the sector.

New Office Automation S.r.L.

Presentation

New Office Automation S.r.L. (NOA), founded in 1982 and the only subsidiary company of the group RICOH in Italy, offers solutions for the rental or sale of printers and multifunctions, 3D printers, audiovisual solutions and videoconferencing for meeting rooms and offices, consulting services and software for document flow management of companies throughout the national territory. Its ATECO specific code is 432102: “installation of electronic systems (including maintenance and repair)”.

The sector

According to Plimsoll, the sector can't boast good results.

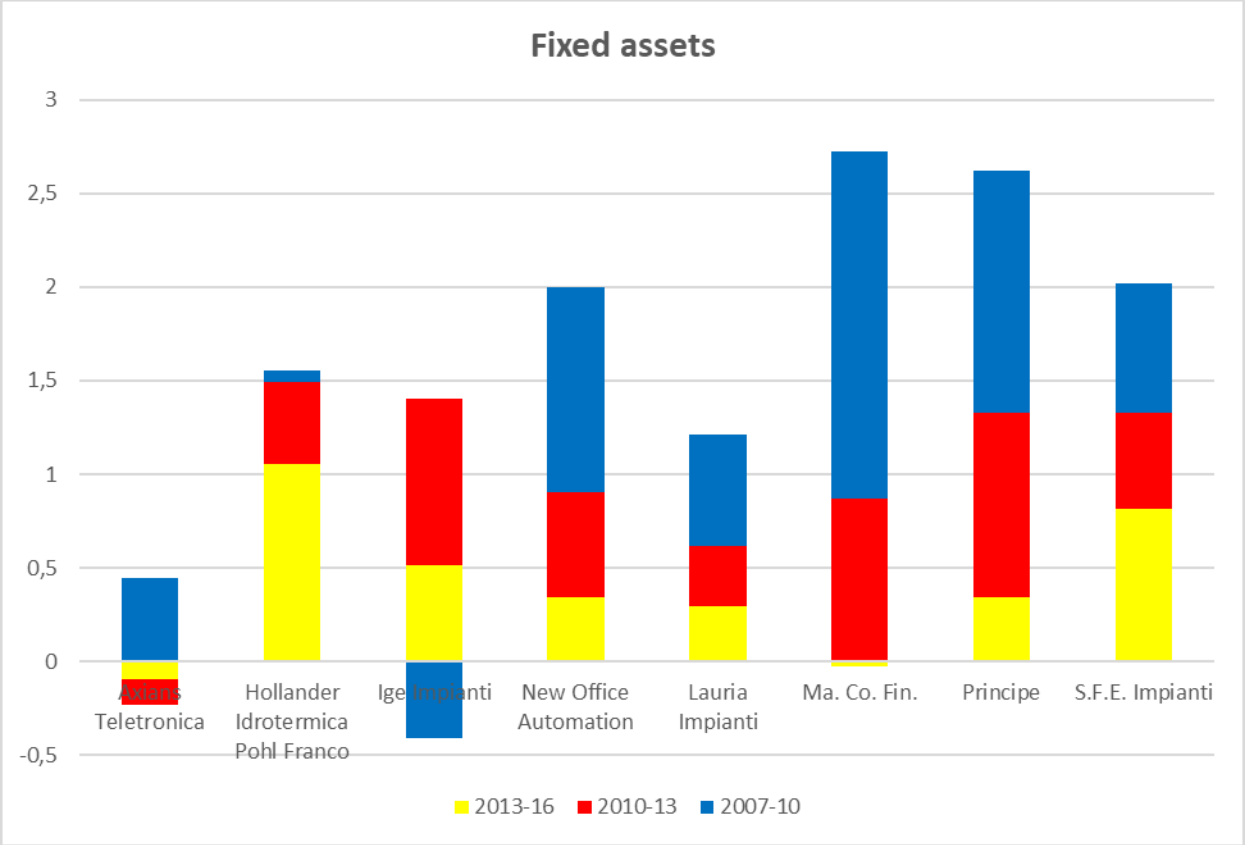
Peer	
Name	432 VL (Very large companies)
Description	Installation of electrical systems, plumbing and other construction and installation work
Size	3.687 companies

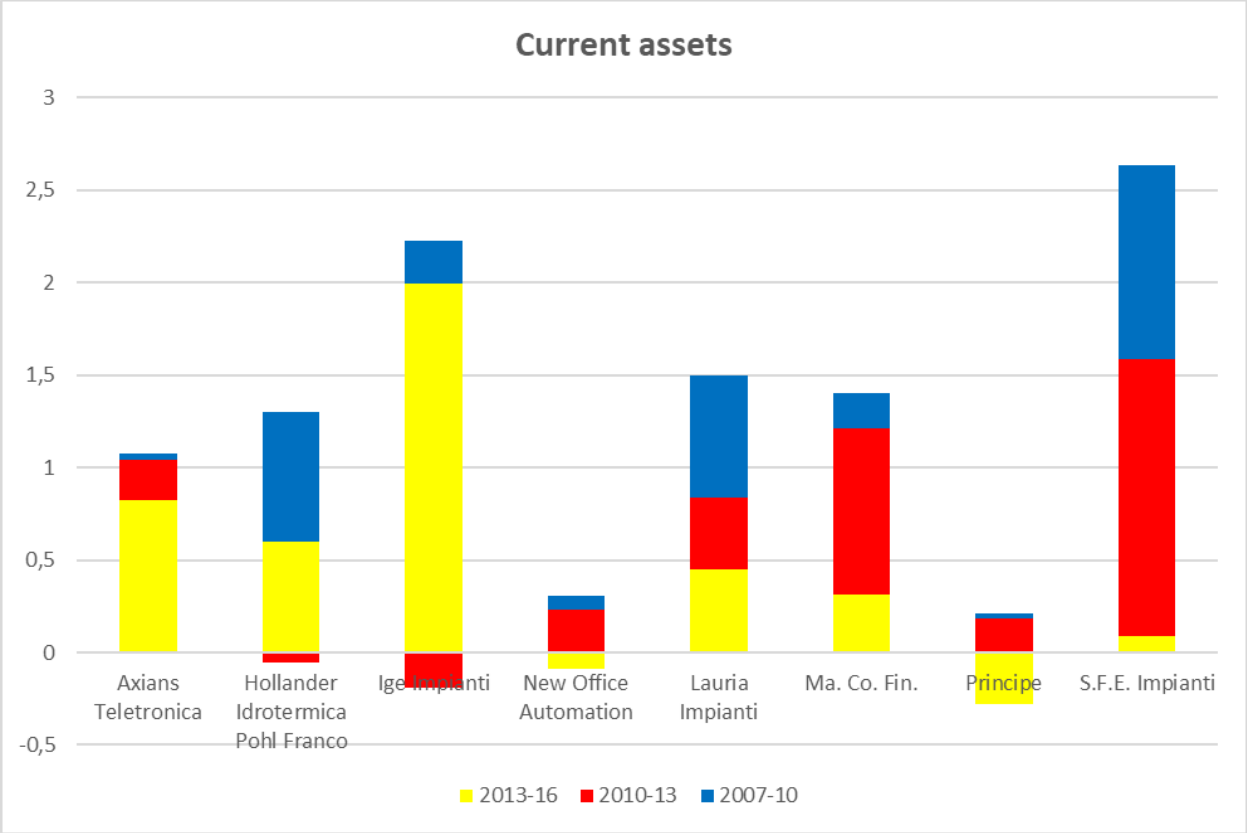
Competitors

Companies	ATECO code	Description
Axians Teletronica	432102	Installation of electronic equipment (including maintenance and repair)
Costruzioni Sarde Tecnologiche	432101	Installation of electrical installations in buildings or other construction works (including maintenance and repair)
Hollander Idrotermica Pohl Franco	432201	Installation of plumbing, heating and air-conditioning systems (including maintenance and repair) in buildings or other construction works
Ige Impianti	432101	Installation of electrical installations in buildings or other construction works (including maintenance and repair)
New Office Automation	**432102**	**Installation of electronic equipment (including maintenance and repair)**
Lauria Impianti	432201	Installation of plumbing, heating and air-conditioning systems (including maintenance and repair) in buildings or other construction works
Ma. Co. Fin.	432909	Other construction and installation works n.e.c.
Principe	432101	Installation of electrical installations in buildings or other construction works (including maintenance and repair)
S.F.E. Impianti	432101	Installation of electrical installations in buildings or other construction works (including maintenance and repair)
Solaris Tech	432101	Installation of electrical installations in buildings or other construction works (including maintenance and repair)

General Comments

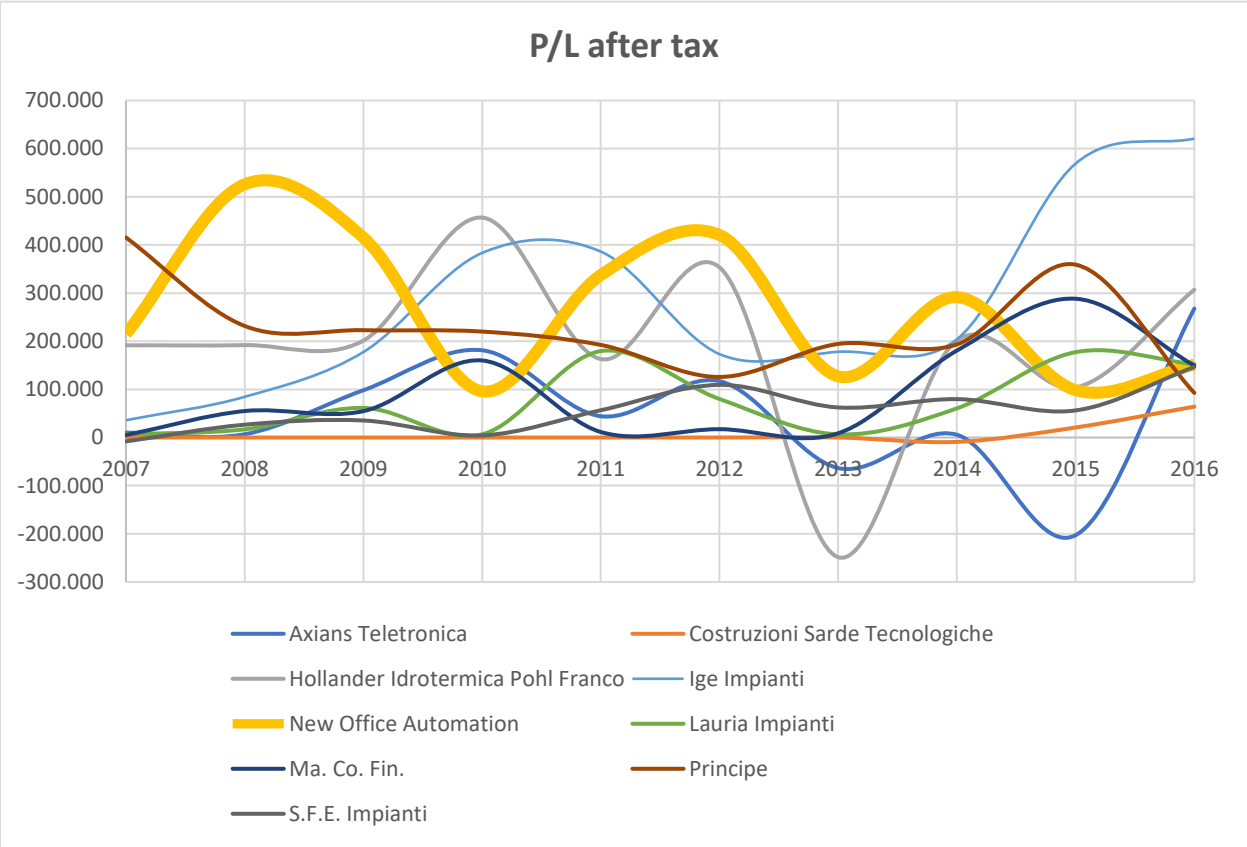
Total assets are enhancing following the average trend: fixed ones (almost all tangible ones) are growing more than average and current ones less, as it seeable in the images below. The amount of stocks is steady and just a little above the medium value. The liquidity situation of NOA is very good.





Shareholder funds are bigger than average and, sometimes, the biggest of the peer, especially in the last years; the capital is steady at €102,000, the third one of the total. Generally, NOA prefers current liabilities, fluctuating around €2 million, to non-current ones (almost null).

Value of production is very constant, always a bit more than €8 million and above the average, except for the last year; added value is very constant too, between €2 million and 2.5 million. Cost of material is frequently one of the taller, but not in the last period, while cost of employees and the number of them, steady too, are in the part of the shorter. P/L results are always over the break-even line, but in light decrease: in particular, they have positive peaks in 2008, 2011 and 2013.



ROE, ROI and ROA were not always available for the sector, but, when they were, it was possible to notice their fluctuations and the decrease in the last year; on the other hand, it's right to state that, for NOA, they always assume positive values. Profit margin follow the same patterns, but with shorter results: the range is between 5 and 30% for the first three indexes and 0-15% for the fourth one. The gross margin instead has one of the lowest value of its peer, settling among 50 and 60%, when the average is near to 70-80%. Stock turnover information weren't available.

In conclusions, New Office Automation shows good balance sheet data, which allow and support the scouting and establishment of new technique items in it business.

Celada S.p.A.

Presentation

Celada, a Group of eight companies present internationally, is a leader in the sale and assistance of machine tools. It chooses the best of industrial and international mechanics to offer its customers a wide and diversified offer that embraces all areas of mechanics: turning, milling, electro-erosion and grinding. Its specific ATECO code is 466200: "wholesale of machine tools (including interchangeable parts)".

The sector

The positive trend reported since 2014 are continuing to grow, driven by both the deliveries of manufacturers in the domestic market and imports. No other country, among the leaders of the sector, will record such significant increases as those obtained by Italy.

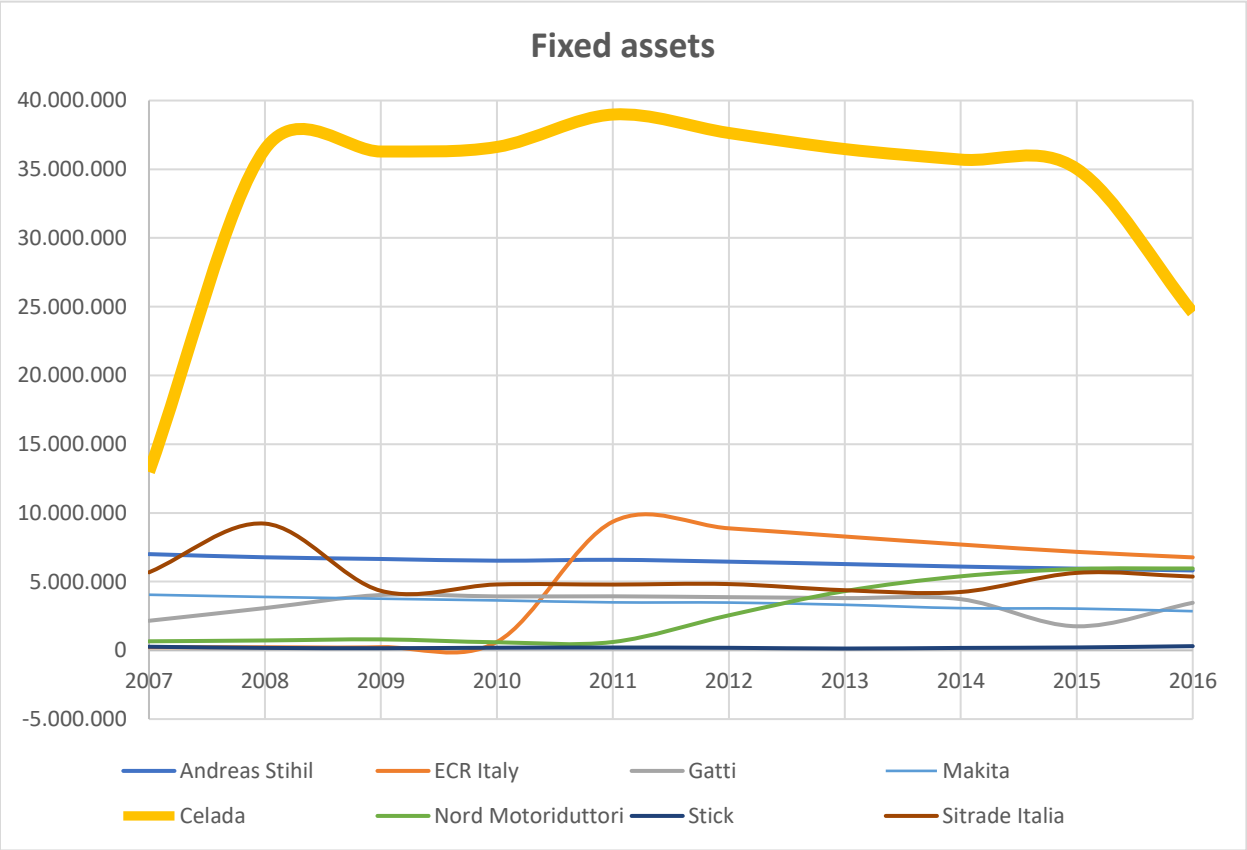
Peer	
Name	466 VL (Very large companies)
Description	Wholesale of other machinery, equipment and supplies
Size	1.649 companies

Competitors

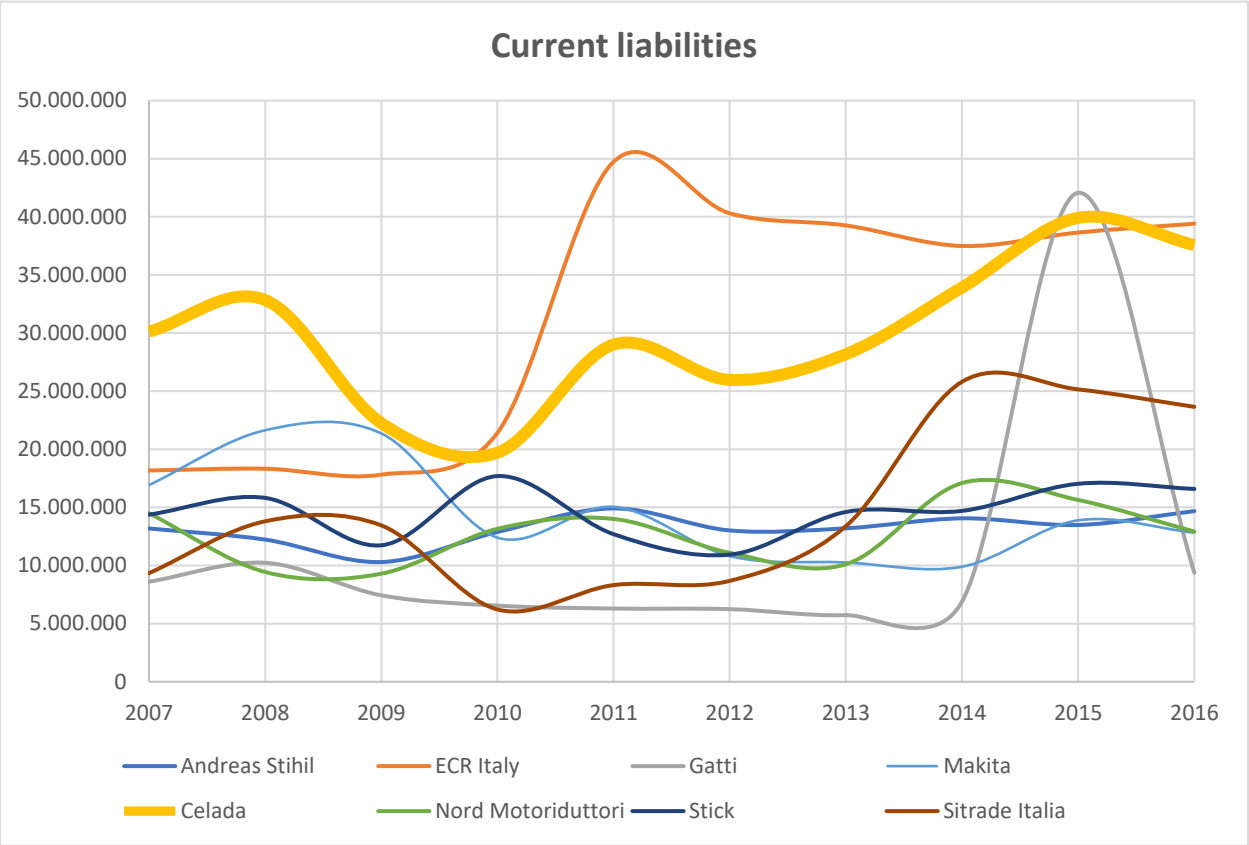
Companies	ATECO code	Description
Andreas Stihil	466100	Wholesale of agricultural machinery, accessories and tools, including tractors
ECR Italy	466999	Wholesale of other machinery and equipment for the industry, trade and navigation n.e.c.
Gatti	466999	Wholesale of other machinery and equipment for the industry, trade and navigation n.e.c.
Makita	466200	Wholesale machine tools (including related interchangeable parts)
Celada	**466200**	**Wholesale machine tools (including related interchangeable parts)**
Nord Motoriduttori	466900	Wholesale of other machinery and equipment
Stick	466000	Wholesale of other machinery, equipment and supplies
Sitrade Italia	466600	Wholesale of other machinery, equipment and supplies

General Comments

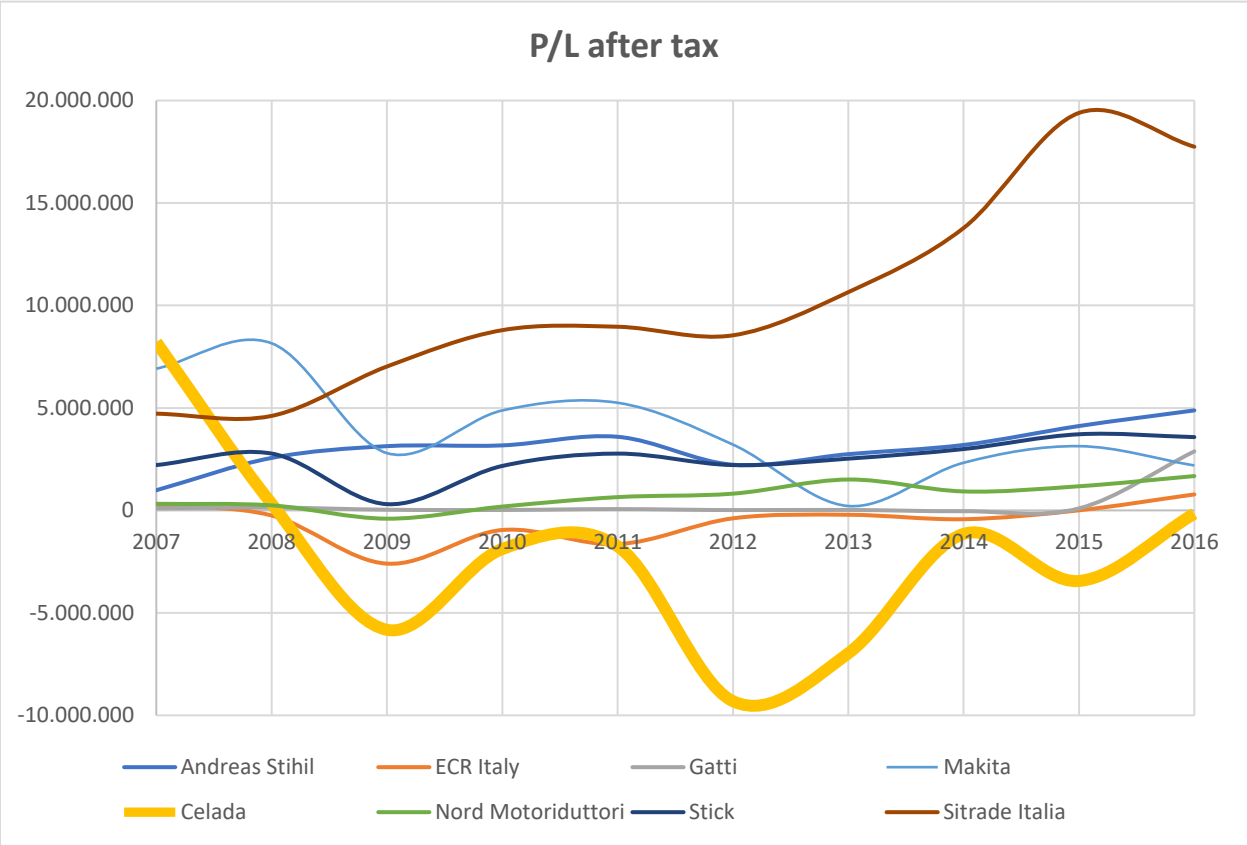
Total assets of Celada and an other brand, Sitrade Italy, are hugely bigger than the rest of the peer: they overcome €80 million when the average of the other six stops at just €40 million. In particular, Celada's fixed assets, €24 million in the last period after a resolute decrease, are about for times bigger than the second ones, but the biggest amount of assets is represented by current ones, reaching €64 million after a collapse between 2007 and 2010 and now one of the highest of the group. Stocks are now constant after a descent period, with two positive peaks in 2008 and 2012 but are already over the average.



Shareholder funds are in reduction too, with the capital being steady at €10 million, but they remain ones of the biggest of the group. The company has big current liabilities (€37 million) and its non-current ones are passed from more than one million to zero in the last two years.



Value of production, after a big fall among 2007 and 2009, are in light and steady increase, reaching €80 million in the last exercise, same millions more than the average of the group; added value is now at €12 million, following the same path of the previous item. Costs of materials have a similar trend too, while costs of employees are dropping like their number through the year but over the medium value, as depreciations which are, on the contrary, constant. P/L results are not good, being negative for the entire period, with the exception of 2016.



Obviously, ROE, ROI, ROA and profit margin follow the same path, whereas gross margin is permanent between 20 and 30%. Stock turnover is high and variable.

To end, Celada boasts big dimensions but its financial and operative results don't seem to justify a stronger position leading to an easier adoption of the technique in its economic trades.

CMF Marelli S.r.L.

Presentation

CMF Marelli has expanded its operating landscape, acquiring the distribution of rapid prototyping systems, quickly becoming one of the few companies in the industrial field, offering complete solutions not only in the industrial sector, but also in the medical one. Since 2006, in fact, has also started the distribution of hardware and software solutions for the dental market. It's precise sector is identified by ATECO code 466200: "wholesale of machine tools (including interchangeable parts)".

The sector

The sector is the one previously introduced; CMF Marelli and Celada don't share the peer because their revenues are different.

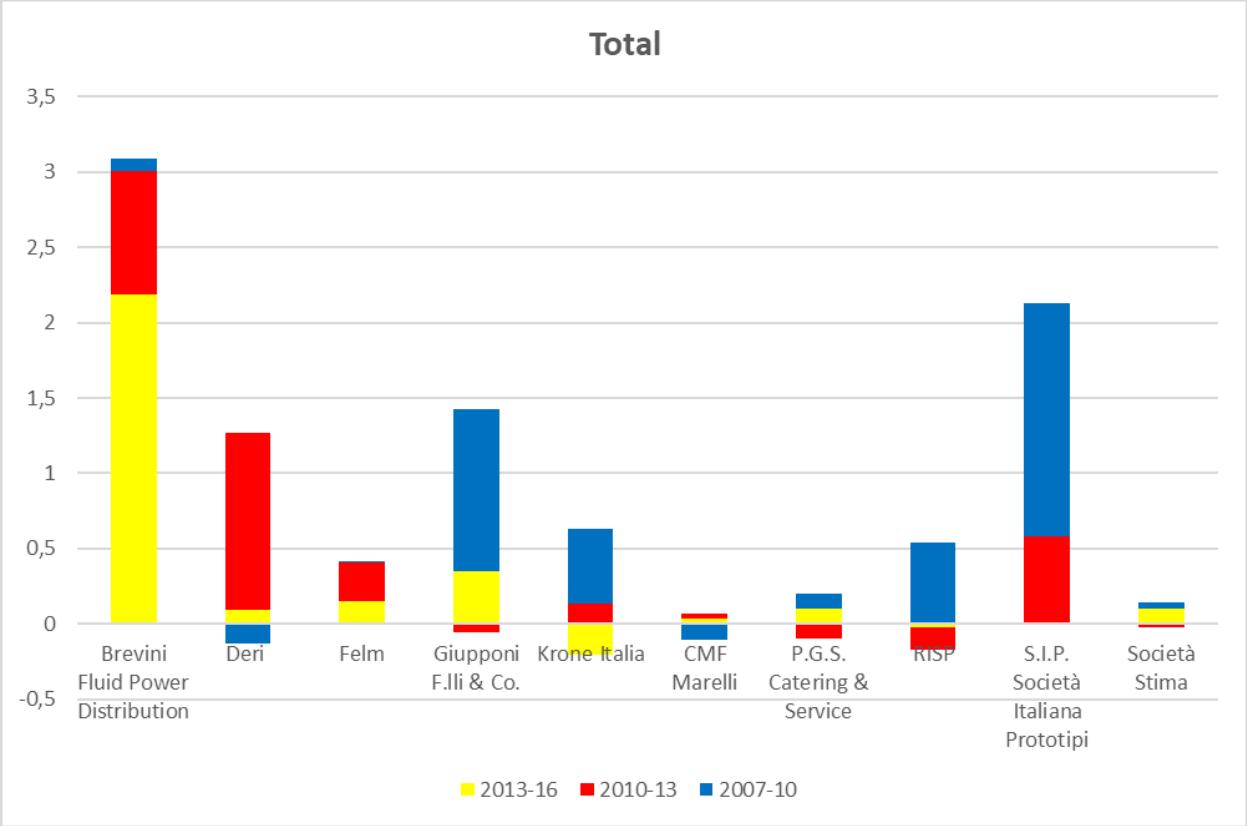
Peer	
Name	466 VL (Very large companies)
Description	Wholesale of other machinery, equipment and supplies
Size	1.649 companies

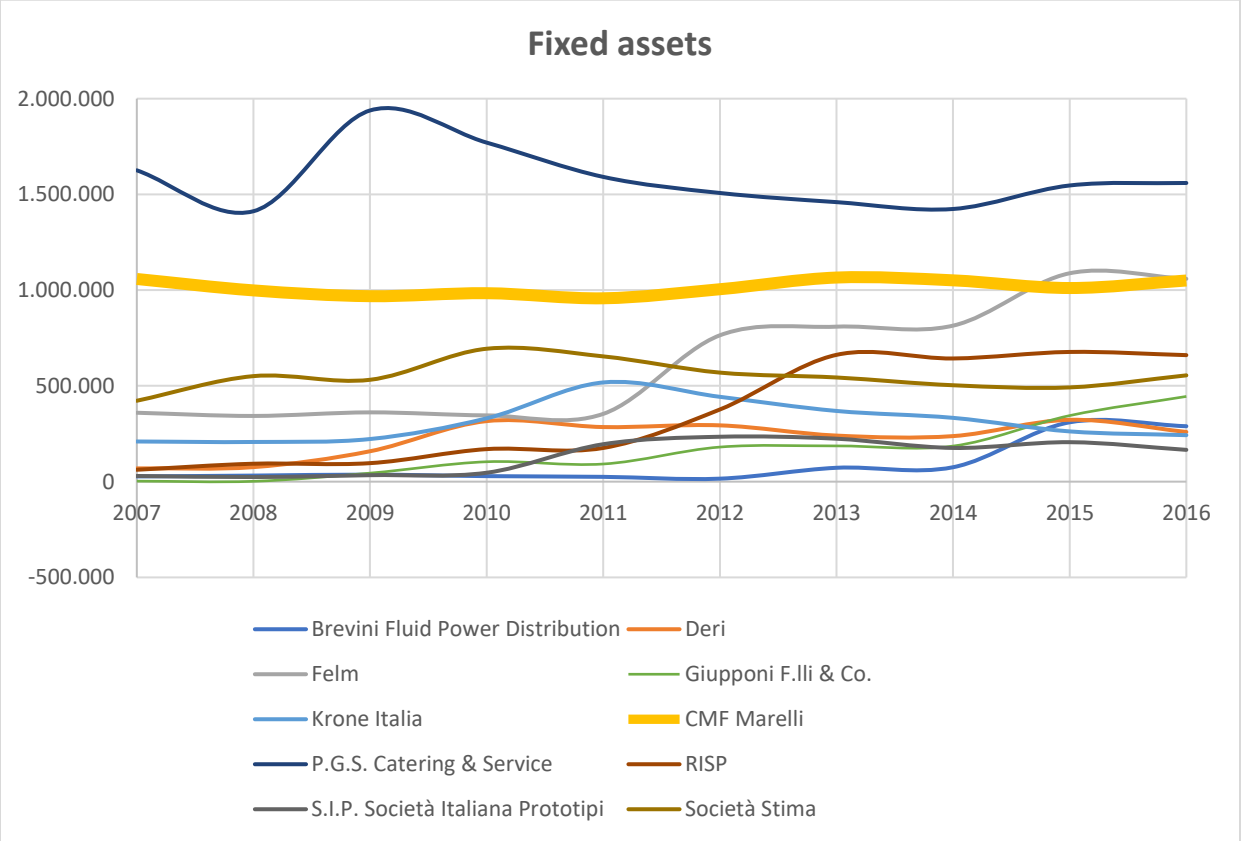
Competitors

Companies	ATECO code	Description
Brevini Fluid Power Distribution	466999	Wholesale of other machinery and equipment for the industry, trade and navigation n.e.c.
Deri	466999	Wholesale of other machinery and equipment for the industry, trade and navigation n.e.c.
Felm	466920	Wholesale of electrical equipment for industrial use
Giupponi F.lli & Co.	466100	Wholesale of agricultural machinery, accessories and tools, including tractors
Krone Italia	466100	Wholesale of agricultural machinery, accessories and tools, including tractors
CMF Marelli	**466200**	**Wholesale machine tools (including related interchangeable parts)**
P.G.S. Catering & Service	466999	Wholesale of other machinery and equipment for the industry, trade and navigation n.e.c.
RISP	466400	Wholesale of machinery for the textile industry, sewing machines and knitting
S.I.P. Società Italiana Prototipi	466999	Wholesale of other machinery and equipment for the industry, trade and navigation n.e.c.
Società Stima	466999	Wholesale of other machinery and equipment for the industry, trade and navigation n.e.c.

General Comments

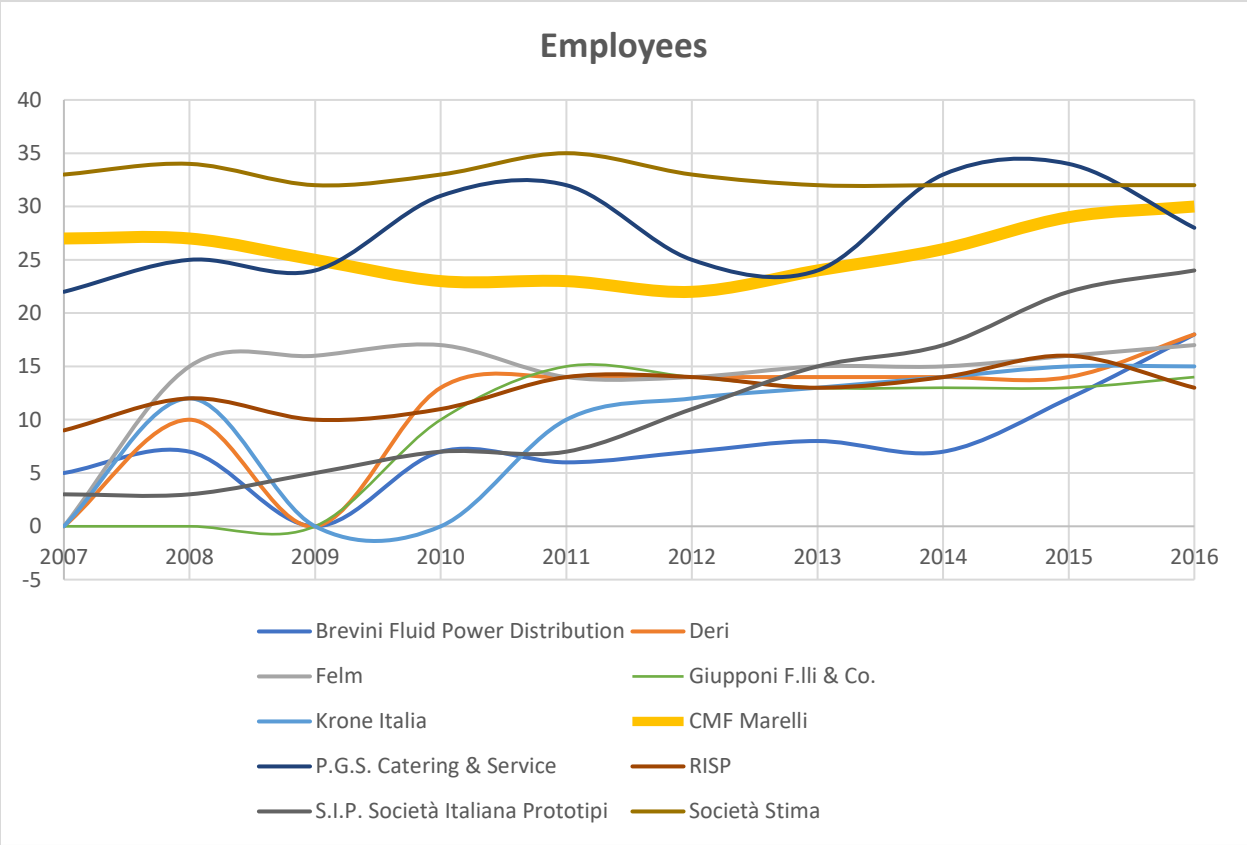
Total assets are very steady and quite bigger than the average of the sector: more in details, fixed ones are very constant, being always around €1 million and over the mean value, with an null amount of intangible ones, and current assets have the same situation but fluctuating around €6 million. Stocks are steady too, being just under €2 million, a little below the average but above the major part of other enterprises.

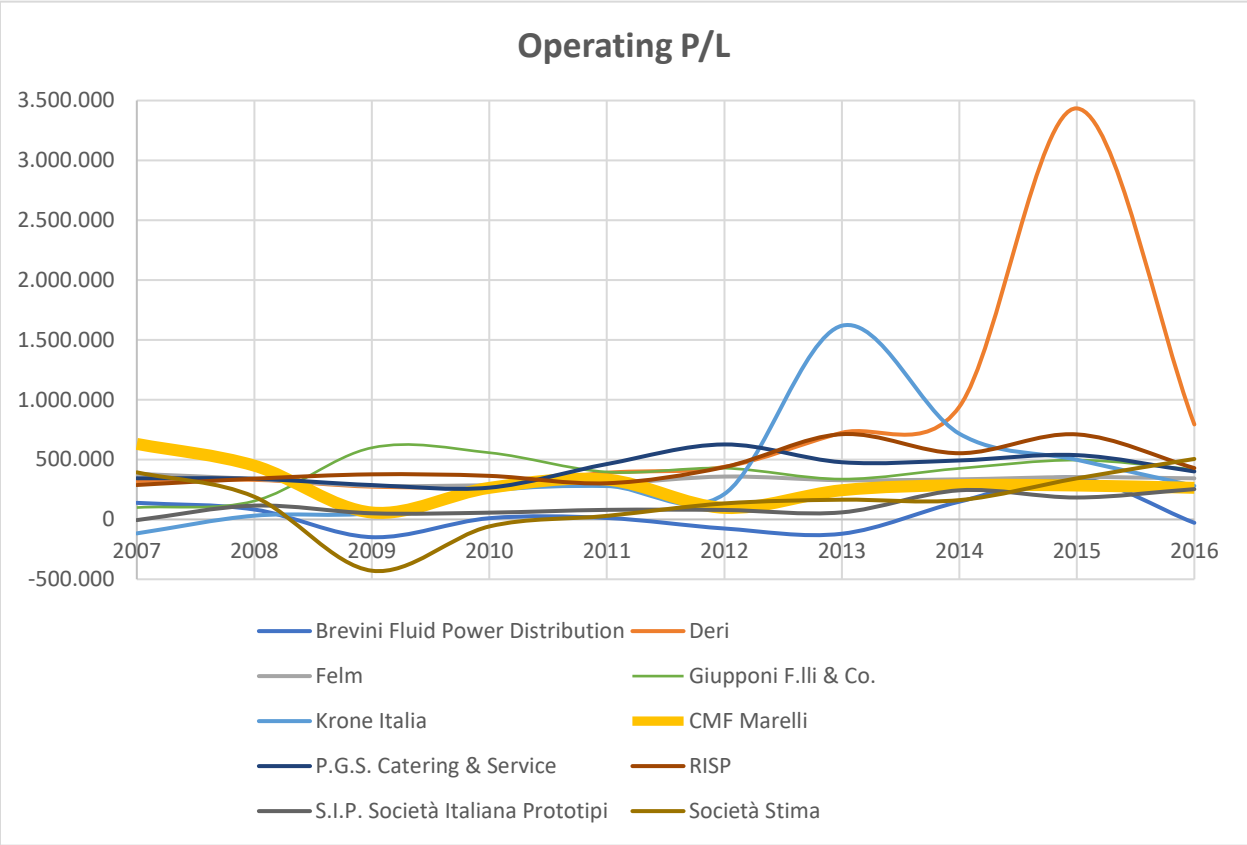

Total
3,5
3
2,5
2
1,5
1
0,5
0
-0,5
Brevini Fluid Power Distribution
Deri
Felm
Giupponi F.lli & Co.
Krone Italia
CMF Marelli
P.G.S. Catering & Service
RISP
S.I.P. Società Italiana Prototipi
Società Stima
2013-16
2010-13
2007-10


Fixed assets
2.000.000
1.500.000
1.000.000
500.000
0
-500.000
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Brevini Fluid Power Distribution
Deri
Felm
Giupponi F.lli & Co.
Krone Italia
CMF Marelli
P.G.S. Catering & Service
RISP
S.I.P. Società Italiana Prototipi
Società Stima

Shareholder funds, like almost all the sector, are in little and steady increase, just above the mean value and below €1.5 million: the capital is always €1 million, much higher than the rest of the group. CMF Marelli, like all the other brands, prefers to finance its activities through current liabilities instead of non-current ones.

Value of production, after a decline between 2007 and 2009, has known a soft but constant increase, reaching the amount of €12 million for the first time, like almost all the other enterprises, with an added value, almost €2.5 million, better than the majority of other firms. Costs of materials follow the general trend remaining the last ones in 2016; on the other hand, costs of employees are the biggest ones, according to their number, which is, with two other companies, higher than the rest. Depreciations are steady and respects the average. P/L results are always above the line of the zero but also below the medium value.





Indexes results reflects the flat graphic of P/L results: always positive value but not much higher than the zero. On the other side, gross margin is the best of the group, floating along 40%. Stock turnover was over the mean value in the past, but now respects it.

To sum up, CMF Marelli obtains good results, although not incredible, which give it the possibility open its horizons to AM technology.

Ridix S.p.A.

Presentation

Based in Grugliasco (Turin), since 1969 has been importing and representing cutting-edge technology and products in the field of precision mechanics on the Italian market. In particular it deals with lubricating and lubricating oils, precision tools in hard metal and diamond, rotating joints and collectors, high-speed milling

machines with three and five axes, plants for rapid production in the world of metals, normalized for molds, industrial marking machines and devices for automation. Its ATECO code is 467502: “wholesale of chemical products for industry”.

The sector

The same assumptions for the previous sector could be done here, due to their similarity.

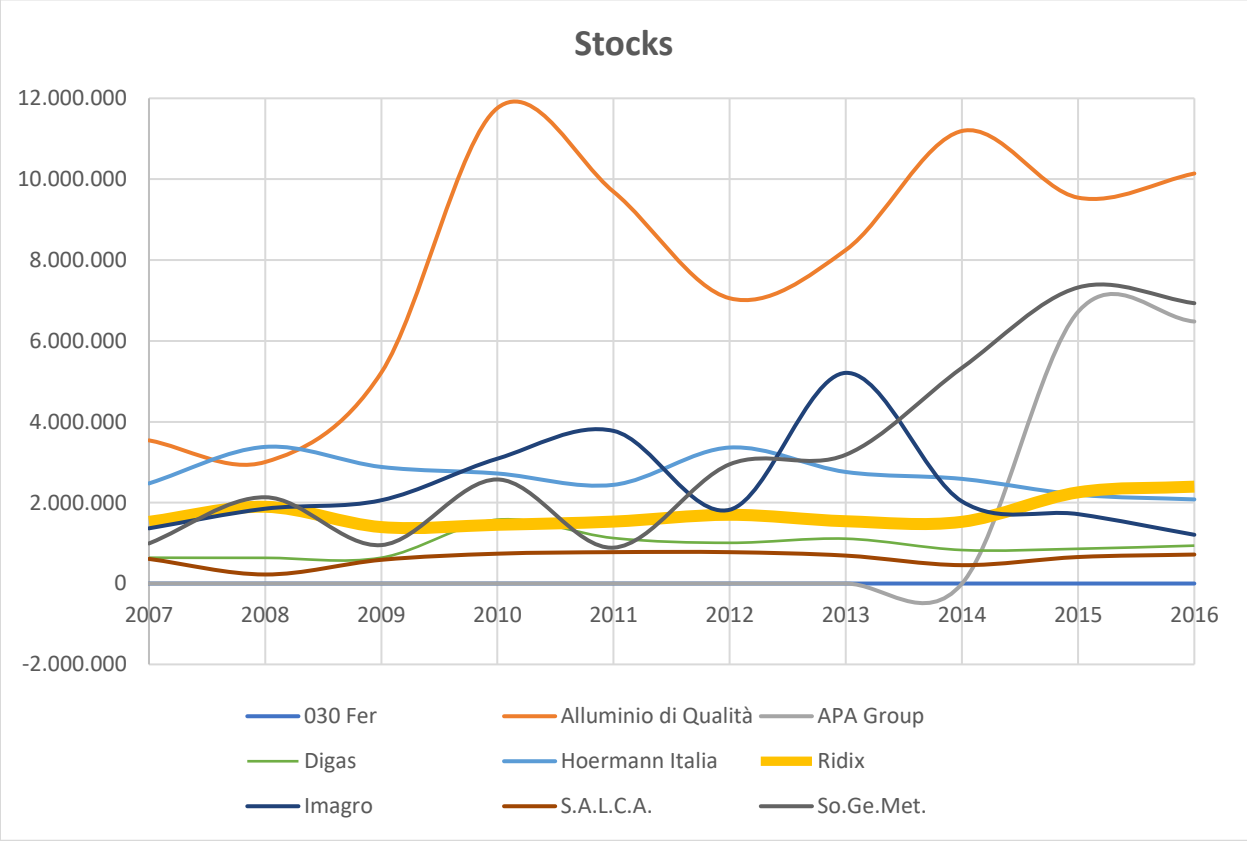
Peer	
Name	467 VL (Very large companies)
Description	Specialized wholesale of other products
Size	2.878 companies

Competitors

Companies	ATECO code	Description
030 Fer	467710	Wholesale of scrap and by-products of metal industrial processing
Alluminio di Qualità	467220	Wholesale of non-ferrous metals and semi-finished products
APA Group	467620	Wholesale of crude rubber, plastics in primary and semi-finished forms
Digas	467100	Wholesale of petroleum products and lubricants for automotive, heating fuels
Hoermann Italia	467329	Wholesale of other building materials
Ridix	**467502**	**Wholesale chemical products for the industry**
Imagro	467620	Wholesale of crude rubber, plastics in primary and semi-finished forms
S.A.L.C.A.	467100	Wholesale of petroleum products and lubricants for automotive, heating fuels
So.Ge.Met.	467210	Wholesale of metallic ores, ferrous metals and semi-finished products

General Comments

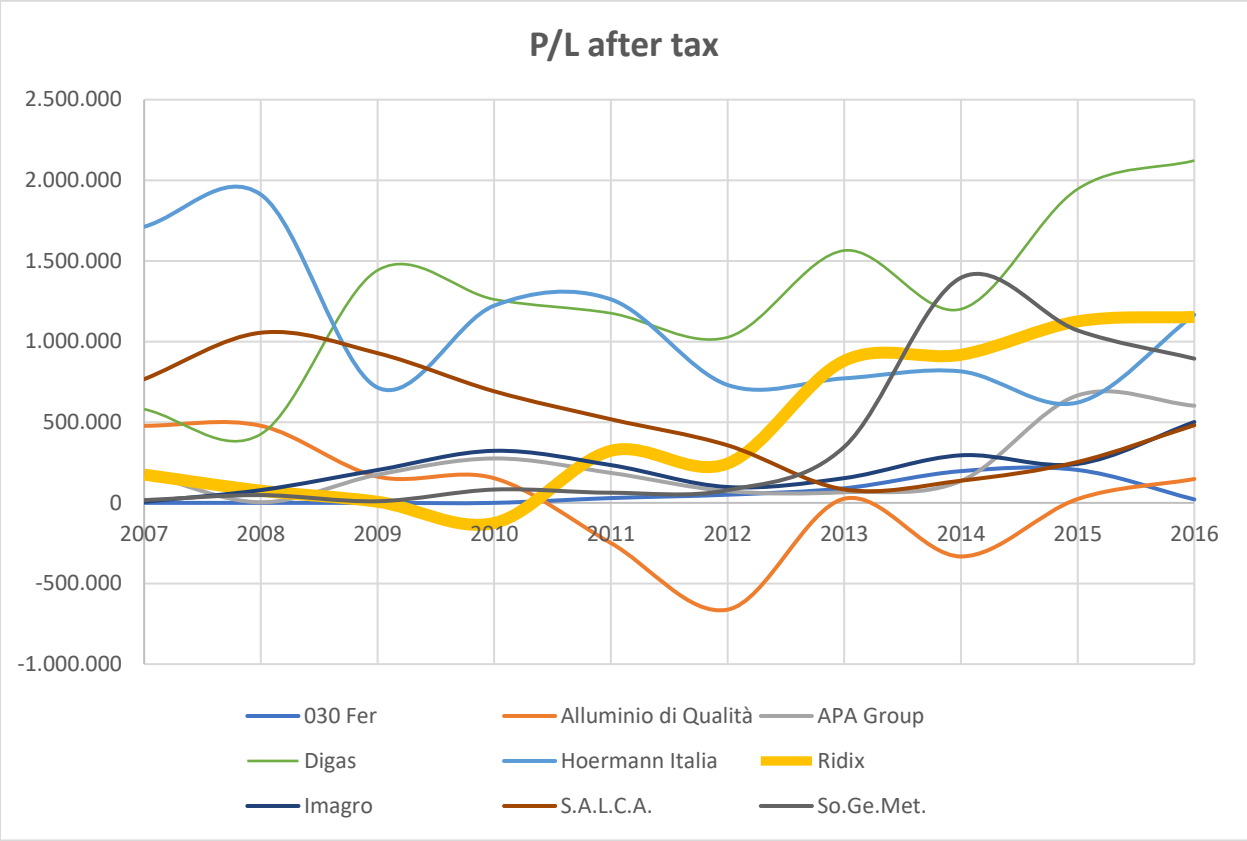
Assets in general are steady and just below the average: more in details, fixed ones (with one of the biggest amount of intangible ones) have known a rise in the last two exercises and current ones are always floating among €11 million and €12 million. Stocks follow the same situation too, as it is observable from the next graphic.



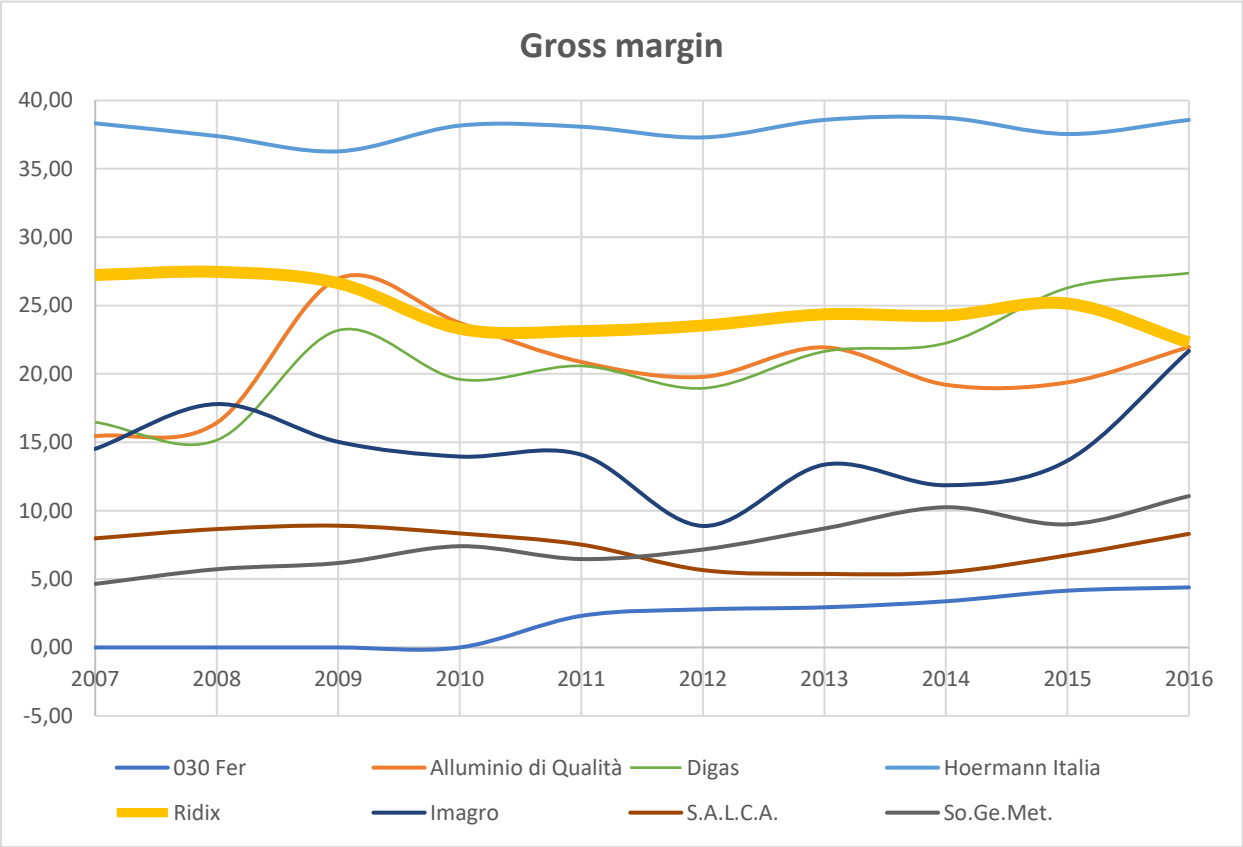
Shareholder funds are always in light increase and quite bigger than the mean value: the capital is variable (unique case), but not much distant from €0.5 million. Non-current liabilities are nil, whereas current ones are a bit less than €7 million, still smaller than almost all the rest.

Value of production, despite the other companies of the peer, is rising, passing from €20 million to €33 million; added value takes the same patterns, but with a stronger enhancing, passing from €2.4 to €4.6 and becoming one of the best of the total. Costs of materials are in light and steady increase, being, at €25.8 million, just below the average; costs of employees, after a soft augment, are now steady, are now

stabilizing at €1.9 million, while the number of them is stuck at thirty-seven in the last three years. Operating P/L shows good results, augmenting considerably in the last four exercises and settling as the second best at €1.6 million, with a P/L having similar outcomes at €1.15 million, but with a little negative value in 2010.



Alongside, ROE shows negative results only in the same year, with a growth in the last ones; ROI, ROA and profit margin are always positive, being below the average in the previous years and above it in the most recent ones. Gross margin is the second best, constant between 20 and 25%. Stock turnover is more variable, but usually boasts quite good results.



To conclude, Ridix has results which are better than almost all the rest of the company and that's a strong encourage to put an other technology, which 3DP is, among its business.

Conclusions about the re-sellers

Generally, these firms show quite good results, but becoming normal ones once compared to the rest of the sector: indeed it's difficult to identify a specific trend and a difference between AM interested and AM not interested changings. The only constant in this scenario is the well behavior of P/L results, growing slightly more than the sector, with added value improving even slower. Any trend was found among the other main items considered, such as assets in general, stocks, total costs, number of employed or P/L results.

Once more, the analysis can't identify, for the moment, any AM specific effect.

AM Experts

CSP S.r.L.

Presentation

Established in Massa Lombarda (Ravenna) twenty years ago, the company is characterized by the continuous search for new ideas and projects, starting from the development of the product to the development of the device or the process. With the rapid prototyping processes, realizes working prototypes and pre-series complete with electronics and mechanics. A section of the Centro Sviluppo Progetti (that's its complete name) is specifically addressing bio-compatible processes and materials to convert rapid prototyping technologies and techniques to the medical sector. The center has numerical control machines of various sizes, CAD/CAM design and development platforms, an electronic laboratory, lathe, milling machine, rapid prototyping material and everything necessary to develop an idea to transform it into a product. CSP collaborates with research centers and universities too, as a center of technology transfer. Its identifying ATECO code is 329990: "manufacture of other item n.e.c.".

The sector

Further information were not available.

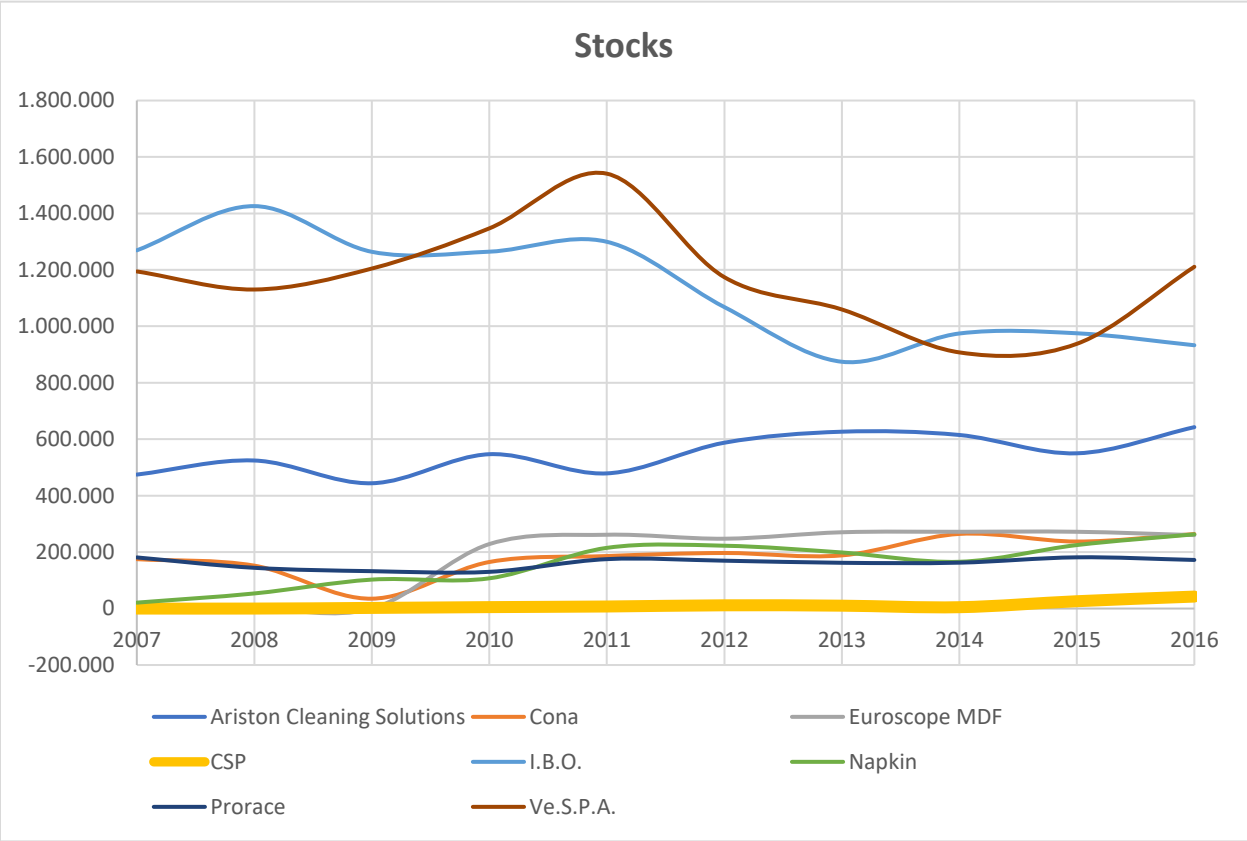
Peer	
Name	329 LA (Large companies)
Description	Manufacture industries n.e.c.
Size	364 companies

Competitors

Companies	ATECO code	Description
Ariston Cleaning Solutions	329100	Manufacture of brooms and brushes
Cona	329990	Manufacture of other items n.e.c.
Euroscope MDF	329100	Manufacture of brooms and brushes
CSP	**329990**	**Manufacture of other items n.e.c.**
I.B.O.	329920	Manufacturing, working and trade in parts and components for beach umbrellas
Napkin	329930	Manufacture of stationery items
Prorace	329912	Manufacture of plastic personal safety items
Ve.S.P.A.	329100	Manufacture of brooms and brushes

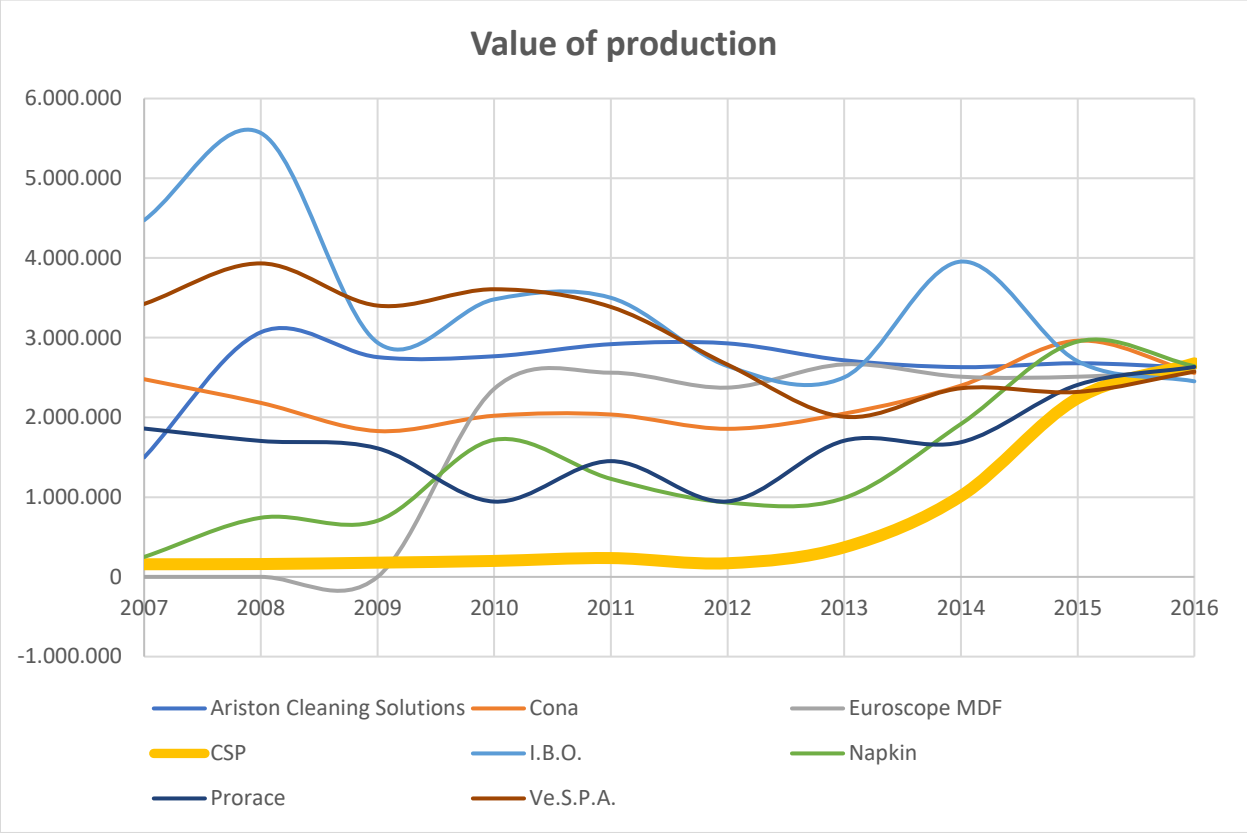
General Comments

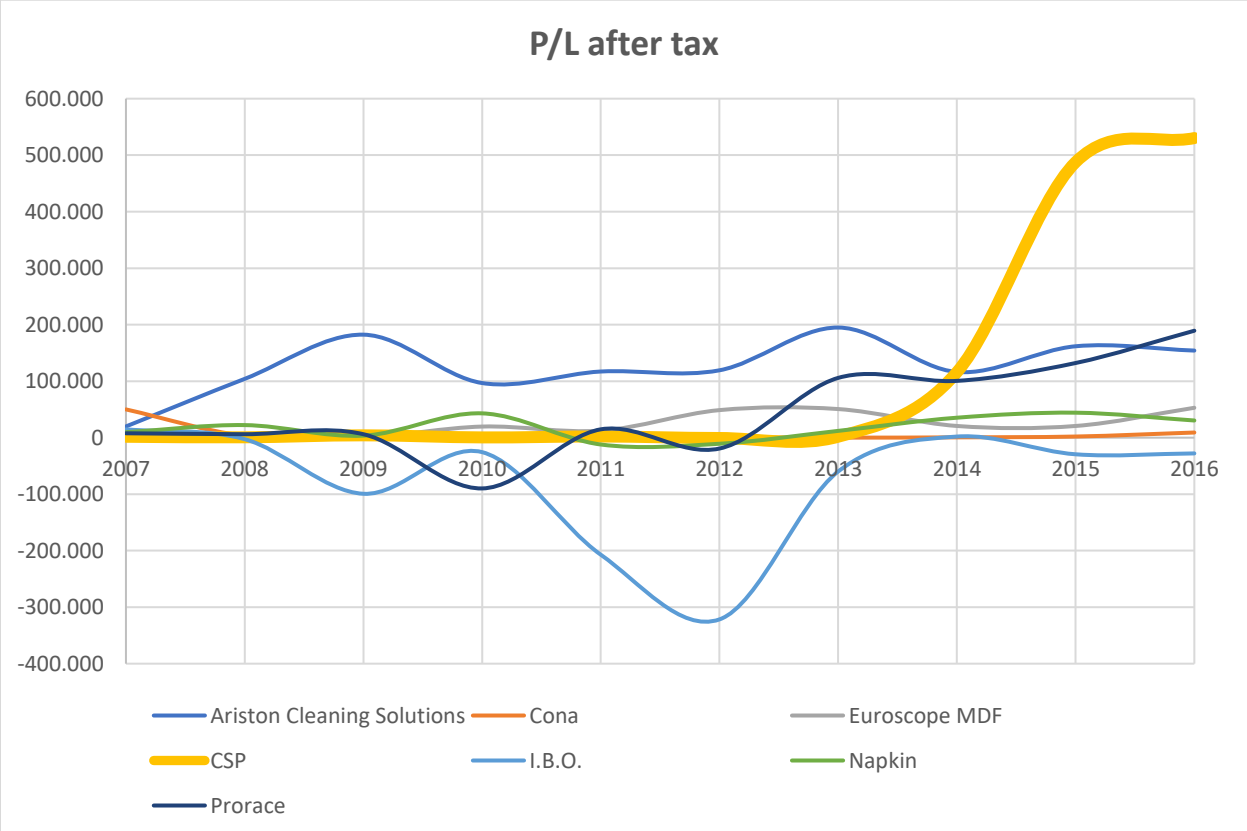
Total assets are very low until 2013, then they have known a rapid growth, getting much closer to the rest of the sector, with €1.5 million in the last exercise. To deepen, fixed ones remain very low, €74,000 in 2016, whereas current ones represent the majority of the total, being responsible for the previous increase. In particular, stocks level stays the shorter one of the peer for many units, as it's observable below; on the other hand, the liquidity situation is the best of the considered ones.



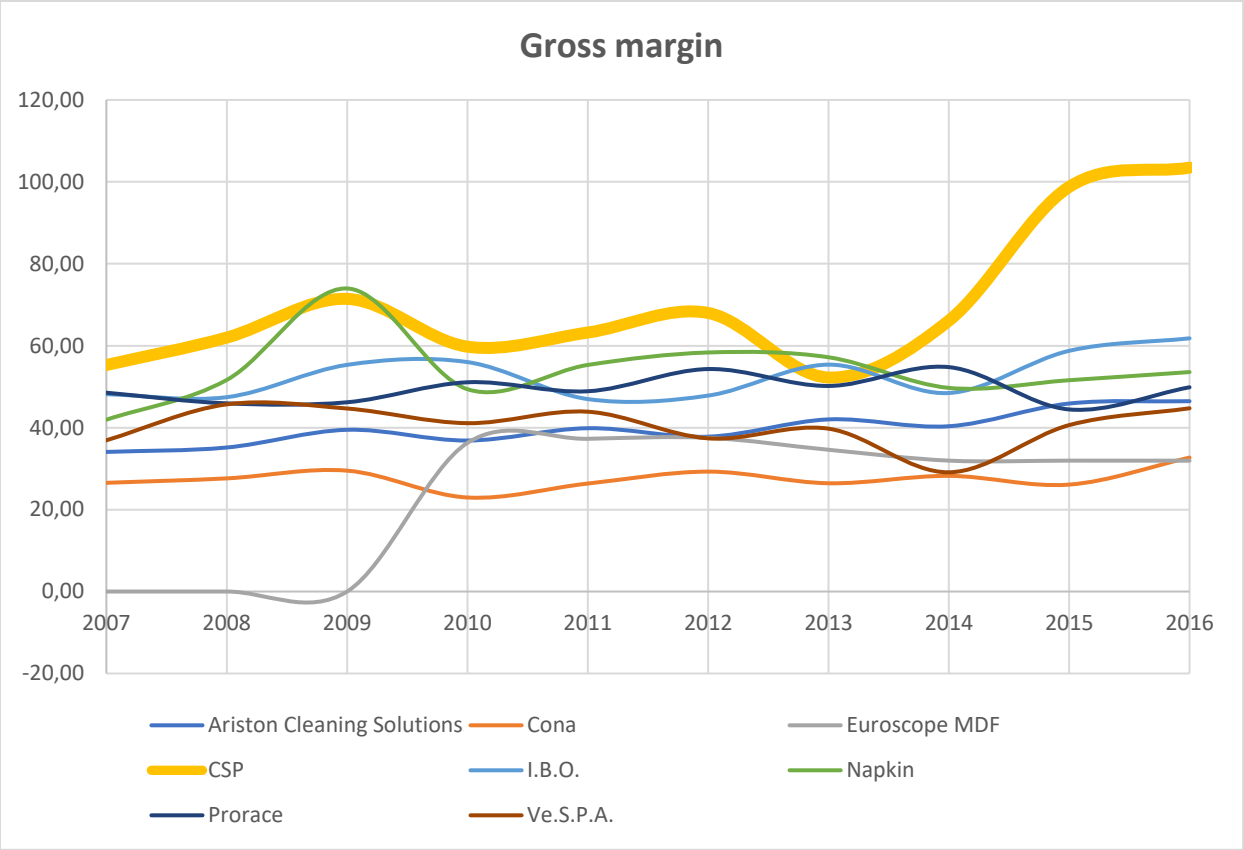
Shareholder funds have known a rapid increase in the last three years too, passing from the lowest position to the highest ones, with the capital remaining steady at €20,000, still the shorter of the group, meaning that reserves and earnings are developing more than the other enterprises. CSP doesn't have non-current liabilities, as most of the companies taken in exam and current ones are growing, remaining still smaller than all the other ones.

Value of production expanded a lot between 2013 and 2016, passing from the last place to the first one, near to €2.7 million, with added value following the same footprints at a half of the previous value. Costs of materials continue to be the smallest ones, while costs of employees, and the number of it, are grown up alongside this big expansion. Depreciations instead remain in the lowest positions. As it is predictable, P/L results are very good, always positive and rising from 2013, settling as the best of the total.


Value of production
6.000.000
5.000.000
4.000.000
3.000.000
2.000.000
1.000.000
0
-1.000.000
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Ariston Cleaning Solutions
Cona
Euroscope MDF
CSP
I.B.O.
Napkin
Prorace
Ve.S.P.A.


P/L after tax
600.000
500.000
400.000
300.000
200.000
100.000
0
-100.000
-200.000
-300.000
-400.000
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Ariston Cleaning Solutions
Cona
Euroscope MDF
CSP
I.B.O.
Napkin
Prorace

ROI, unfortunately, is not available, while ROE and ROA show good results, scratching 50% in 2016's exercise and with only a negative value for ROE in 2012 (-2%); the same considerations are valid for profit margin. Gross margin, as it is predictable again, is the best of the group, overcoming 100% in 2016.



To conclude, CSP boasts much better results than the rest of the peer, and this, among the other things, is thanks to the adoption of AM which, as it is notable from the previous graphics, has led to an important growth in its sector.

EOS S.r.L.

Presentation

EOS is a global technology leader for industrial 3D printing of metals and polymers. Founded in 1989, the independent company is a pioneer and innovator for holistic solutions in additive manufacturing. Everything EOS does is founded on the cornerstones of corporate responsibility and sustainability, both inward- and outward-facing. Electro Optical Systems is mastering the interaction of laser and powder material. Additionally, it provides all essential elements for industrial 3D printing. System, material and process parameters are intelligently harmonized to ensure a reliable high quality of parts and thus facilitating a decisive competitive edge. Furthermore customers benefit from deep technical expertise in global service, applications engineering and consultancy. Its Italian division is based in Milan and its specific ATECO code is 465100: “wholesale of computers, computer peripheral equipment and software”.

The sector

This sector, after a crisis finished between 2012 and 2013, is now at the heart of the country's digital transformation processes.

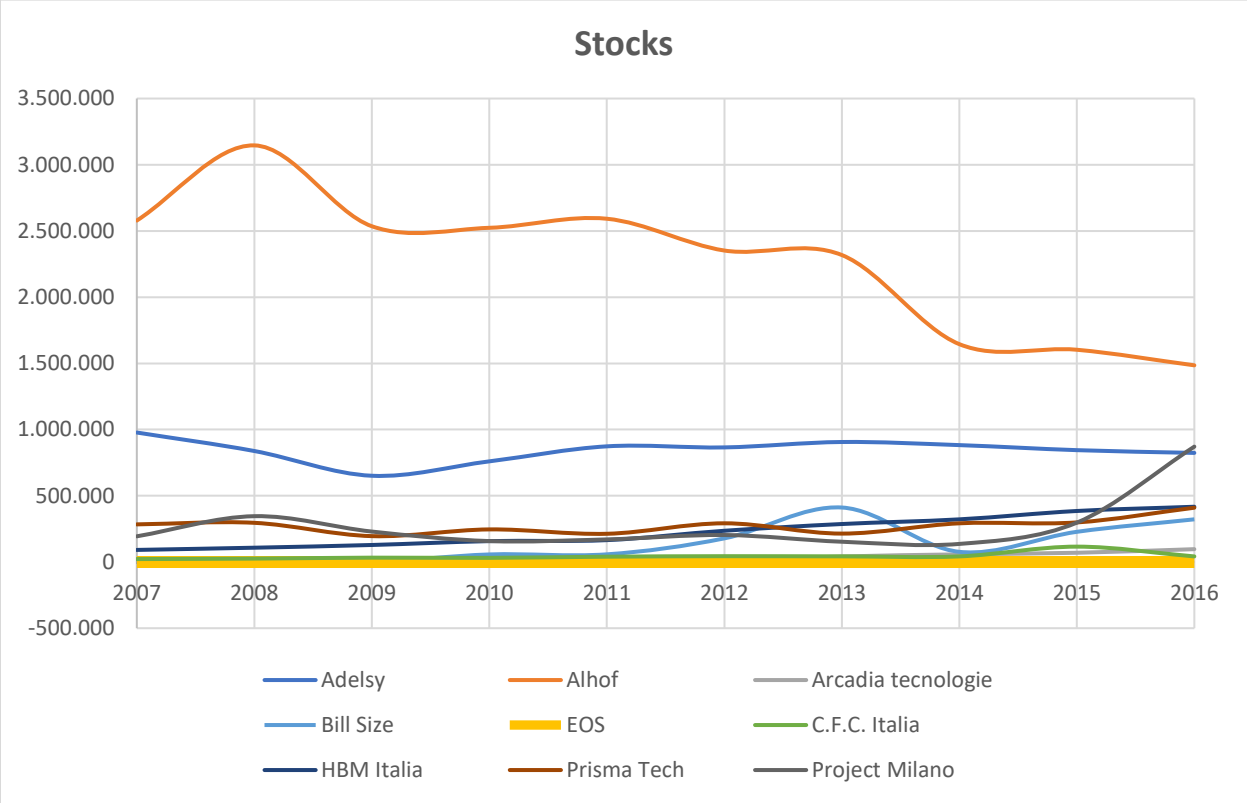
Peer	
Name	465 LA (Large companies)
Description	Wholesale of ICT equipment
Size	539 companies

Competitors

Companies	ATECO code	Description
Adelsy	465209	Wholesale of other electronic telecommunications equipment and other electronic components
Alhof	465209	Wholesale of other electronic telecommunications equipment and other electronic components
Arcadia tecnologie	465100	Wholesale of computers, computer peripheral equipment and software
Bill Size	465201	Wholesale of telephone materials and equipment
EOS	**465100**	**Wholesale of computers, computer peripheral equipment and software**
C.F.C. Italia	465100	Wholesale of computers, computer peripheral equipment and software
HBM Italia	465209	Wholesale of other electronic telecommunications equipment and other electronic components
Prisma Tech	465100	Wholesale of computers, computer peripheral equipment and software
Project Milano	465100	Wholesale of computers, computer peripheral equipment and software

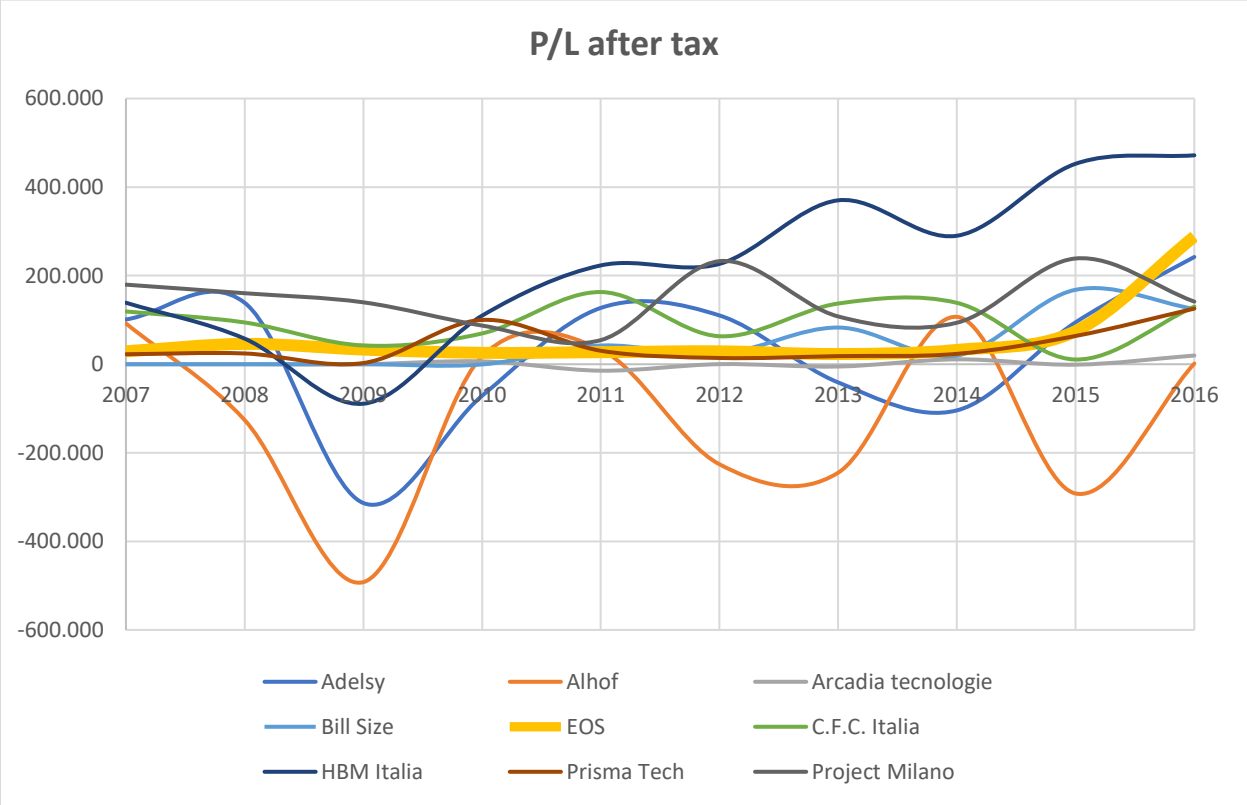
General Comments

Total assets have grown up considerably in the last periods, more than the rest of the sector, settling as one of the highest ones. Fixed ones remain low, with a little amount of both intangible, €50.000, and tangible, €99,000; current assets have risen more and more than the other companies. The level of stocks is nil in every years considered. The liquidity situation is good and the second best of the peer.



Shareholder funds augmented more than the average in the last two years, remaining short and with a steady capital of €11,000. EOS doesn't have non-current liabilities, whereas current ones are the third highest of the batch.

Value of production is the second most increased one, reaching €8.8 million in 2016, with an added value, the second best and with a good escalation too, of €1.7 million. Costs of materials have grown up a lot with the increase of production but they respect the average; costs of employees and its number have augmented more. Depreciations are still very low. P/L results are generally good and the ones with the better increase in the last three years.



ROE and ROA, after a decrease in the middle period, are increasing again; no data of ROI were available. Profit margin follows the same path, while gross margin is more variable and average-respecting. Stock turnover is not available.

To sum up, EOS has reached important operative and economic results in the last years including 3DP in its business.

Jdeal-Form S.r.L.

Presentation

Based in Oleggio (Novara), this company was founded in the 50's. It produces principally metal items, specialized in smallware. Its ATECO code is 259999: "manufacture of other metal items and metal smallware n.e.c.".

The sector

Further information were not available.

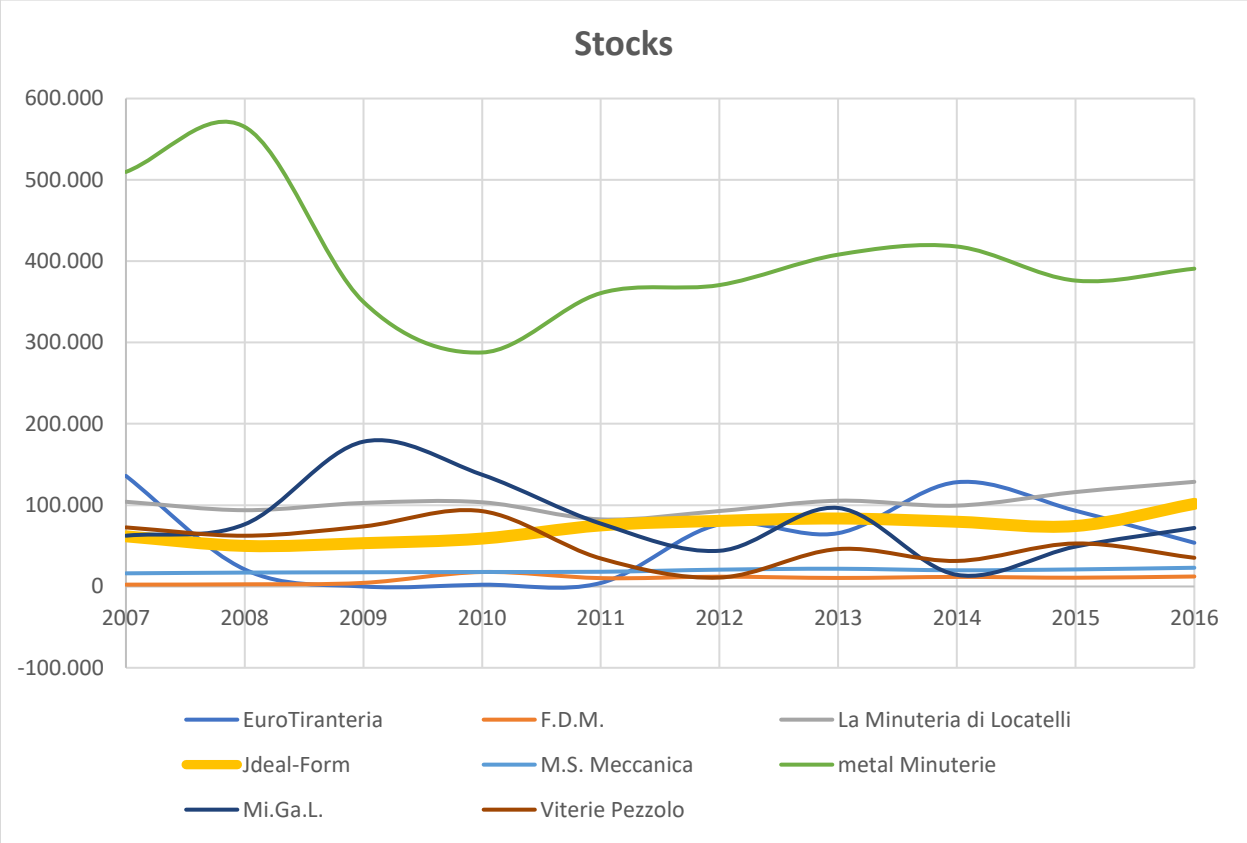
Peer	
Name	259 ME (Medium companies)
Description	Manufacture of other metal parts
Size	1481 companies

Competitors

Companies	ATECO code	Description
EuroTiranteria	259310	Manufacture of wire products
F.D.M.	259999	Manufacture of other metal items and metal smallware n.e.c.
La Minuteria di Locatelli	259999	Manufacture of other metal items and metal smallware n.e.c.
Jdeal-Form	**259999**	**Manufacture of other metal items and metal smallware n.e.c.**
M.S. Meccanica	259999	Manufacture of other metal items and metal smallware n.e.c.
Metal Minuterie	259999	Manufacture of other metal items and metal smallware n.e.c.
Mi.Ga.L.	259999	Manufacture of other metal items and metal smallware n.e.c.
Viterie Pezzolo	259400	Manufacture of fasteners and screw machine products

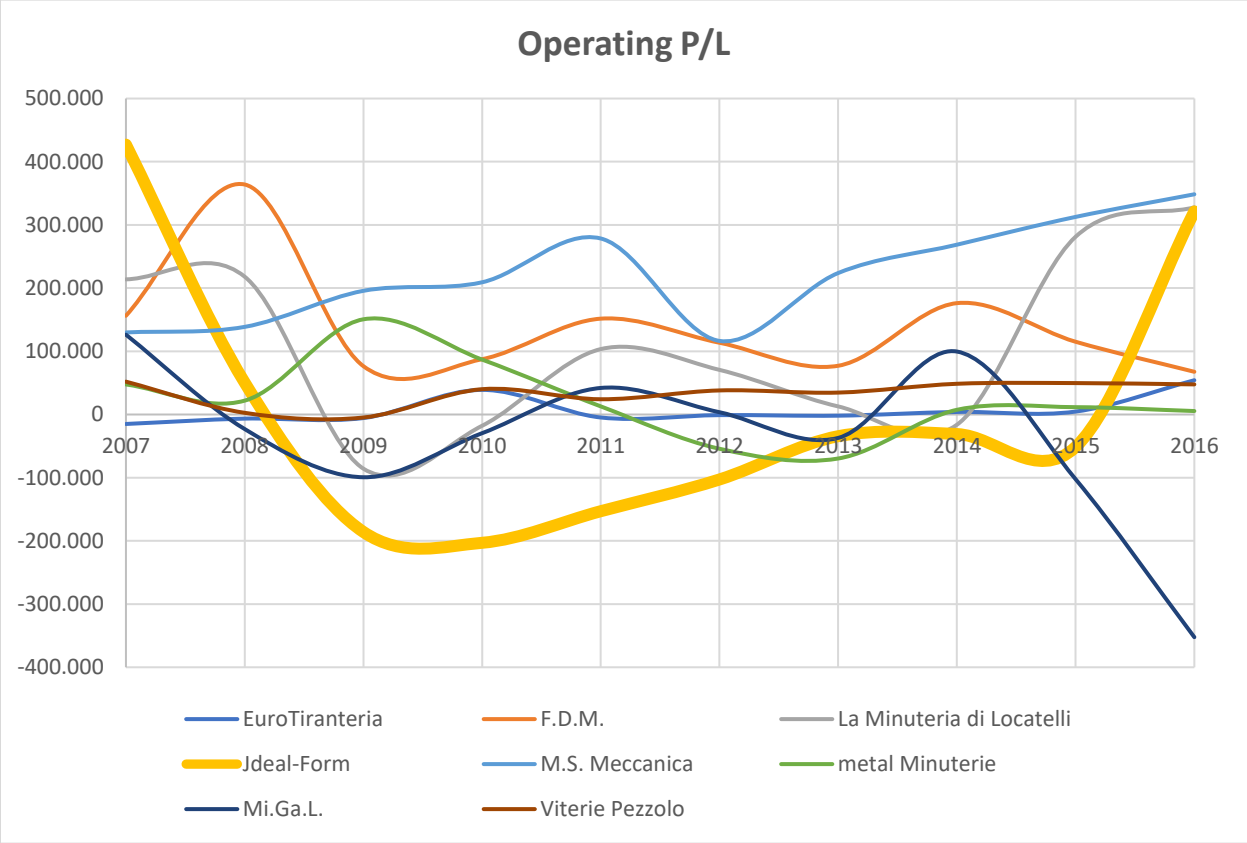
General Comments

Total assets, after a constant decrease between 2007 and 2011, are now stable: fixed ones are in light descent, while current ones are following more the general trend; averagely they respect the mean value. Stocks have taken a 25% in the last exercise, but usually they aren't high and fluctuate around the medium value too. In 2016 the liquidity situation of Jdeal-Form is the second best of the peer.



Shareholder funds are reduced and always under the mean value in the last period, but increasing between 2015 and 2016; the capital is constant at €20,000. Non-current liabilities have diminished and current ones are grown-up, both respecting the average of the group.

Value of production, after a collapse between 2007 and 2009, is now raising back, becoming the first of the companies taken in exam for a few euros in 2016; added value knew that collapse too, and now, after a rapid improvement in the last exercise, is the best one. Costs of materials remain in the lowest positions, augmenting less than the previous items; costs of employees and the number of them are stable and quite high. Depreciations same years are null and same other ones, like in 2014 and 2016, not; more in details, in the second year they are almost the tallest ones. P/L results are variable: very good in 2007 and 2016, compared to the rest of the brands, negative and among the worst of the group in the middle, mostly between 2009 and 2011.



Indexes, when available, in general show a similar situation. Gross margin is one of the best, settling at a bit less than 90% after being 65% two years before. Stock turnover data were not available.

To sum up, Jdeal-Form, after a period of losses and awful results, has know an incredible raise in the last exercise, in which, thanks to the adoption of additive manufacturing through its business, has improved a lot its earnings, now positive again.

LimaCorporate S.p.A.

LimaCorporate is an enterprise based in San Daniele del Friuli (Udine), active in the development, production and marketing of orthopedic replacement prostheses of bone joints for the knee, hip, shoulder and minor joints. Active since the mid-forties in the medical sector, with the original Lima founded by Carlo Leopoldo Lualdi, it has specialized over the years from the production of surgical instruments

to that intended for orthopedics and traumatology. Its ATECO code is 325030: “manufacture of orthopedic prosthesis, other prosthesis and aids (including repairs)”.

The sector

This sector is knowing a huge expansion in the last years, and Italy is one of the leading countries in the production and implantation of prosthesis and in dental sector.

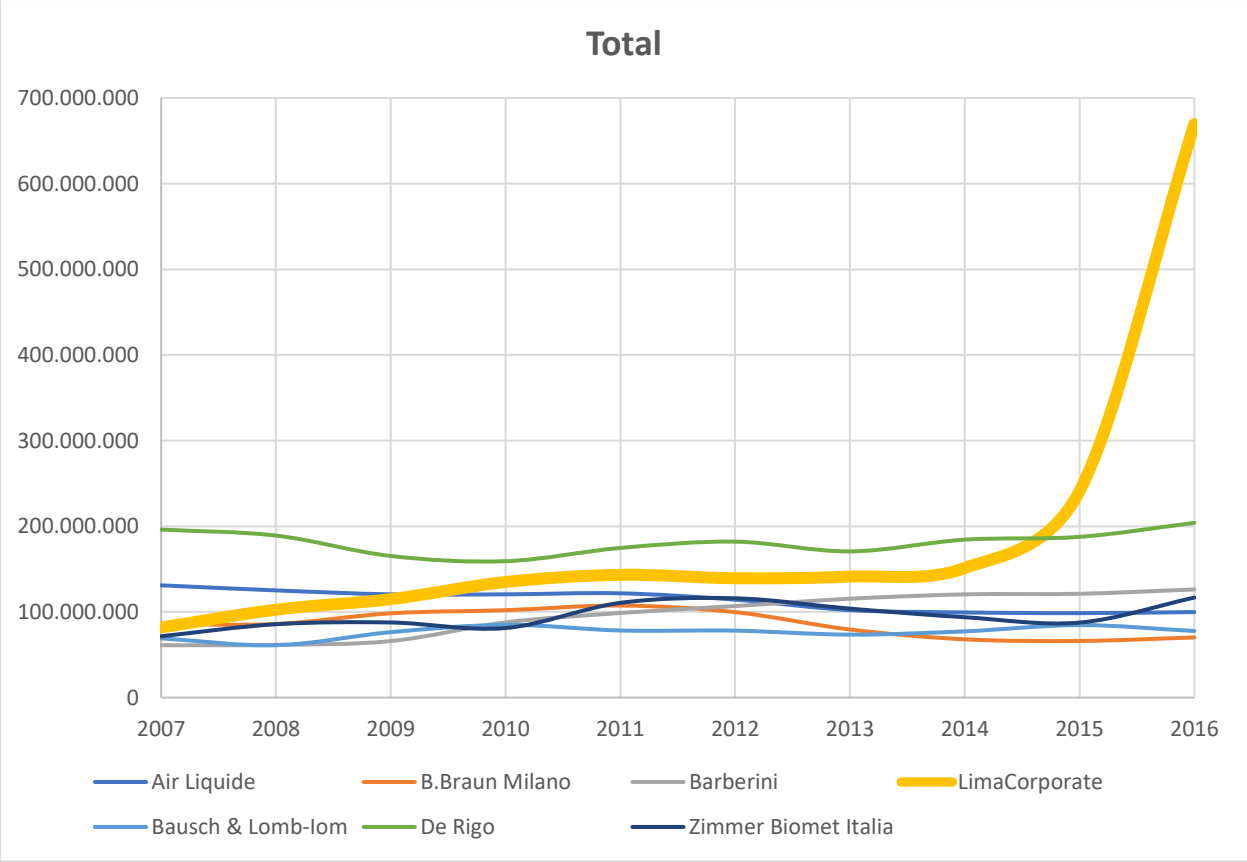
Peer	
Name	325 VL (Very large companies)
Description	Manufacture of medical and dental instruments and supplies
Size	199 companies

Competitors

Companies	ATECO code	Description
Air Liquide	325010	Manufacture of medical furniture, medical devices for diagnosis, medical-surgical and veterinary equipment, dental equipment and instruments (including detached parts and accessories)
B.Braun Milano	325011	Wholesale trade of products concerned with medicines, surgery, hygiene and associated goods
Barberini	325040	Manufacture of ophthalmic lenses
LimaCorporate	**325030**	**Manufacture of orthopaedic prosthesis, other prosthesis and aids (including repairs)**
Bausch & Lomb-Iom	325040	Manufacture of ophthalmic lenses
De Rigo	325050	Manufacture of rims for spectacles of any kind; mass framing of common glasses
Zimmer Biomet Italia	325012	Purchase and sale of surgical goods, orthopedic equipment, chemicals etc.

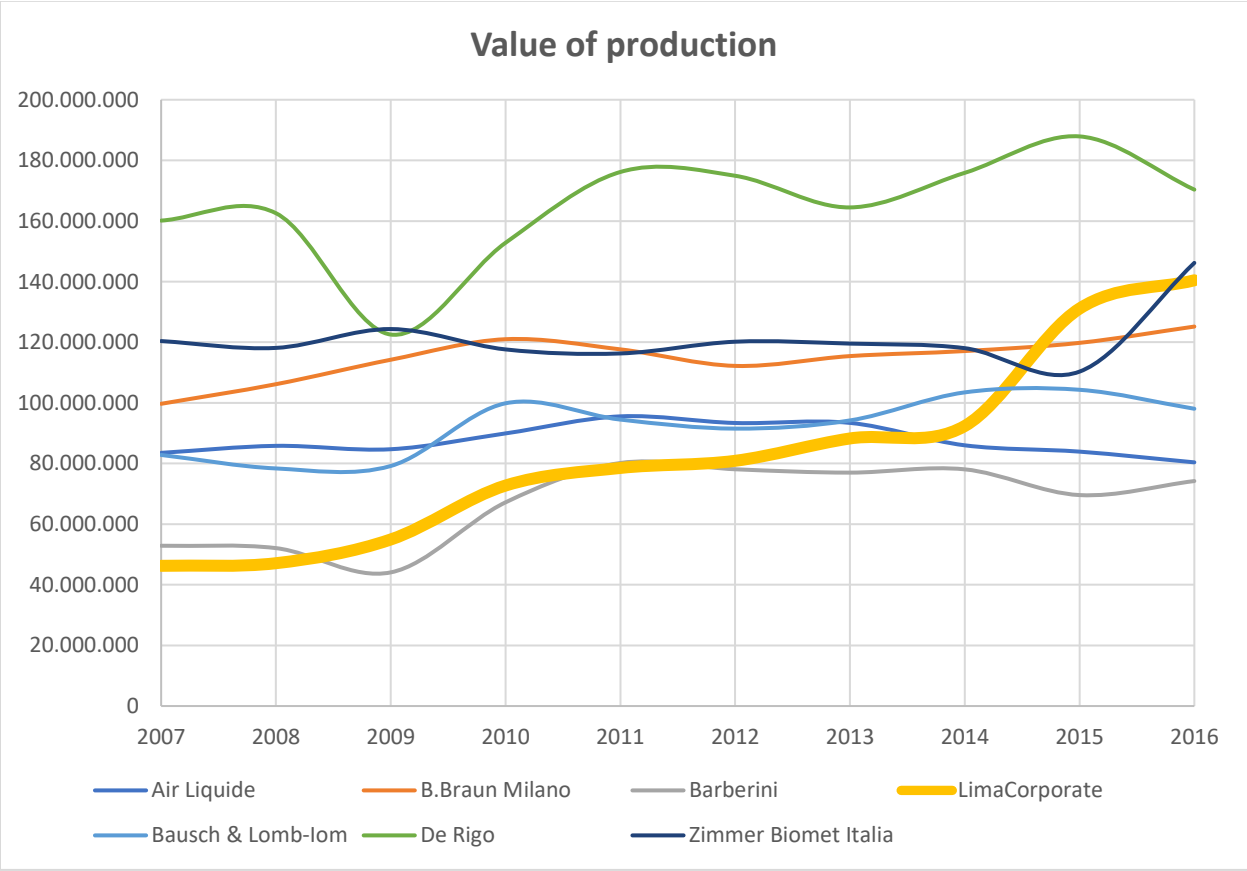
Presentation

Total assets, after being steady in the previous years, have grown up considerably from 2014, reaching the astonish point of €670 million, much more than all the other companies: fixed assets, and mostly intangible ones, thanks to the big rising of goodwill, passed from €322,000 to €263 million, are the principal responsible of the augment, while current ones have known a big but lower increase, being however the best in their category too. The amount of stocks is bigger, but in second place, and the raise is not incredible as the former one is LimaCorporate, as the other brands in the peer, doesn't have problems of liquidity.

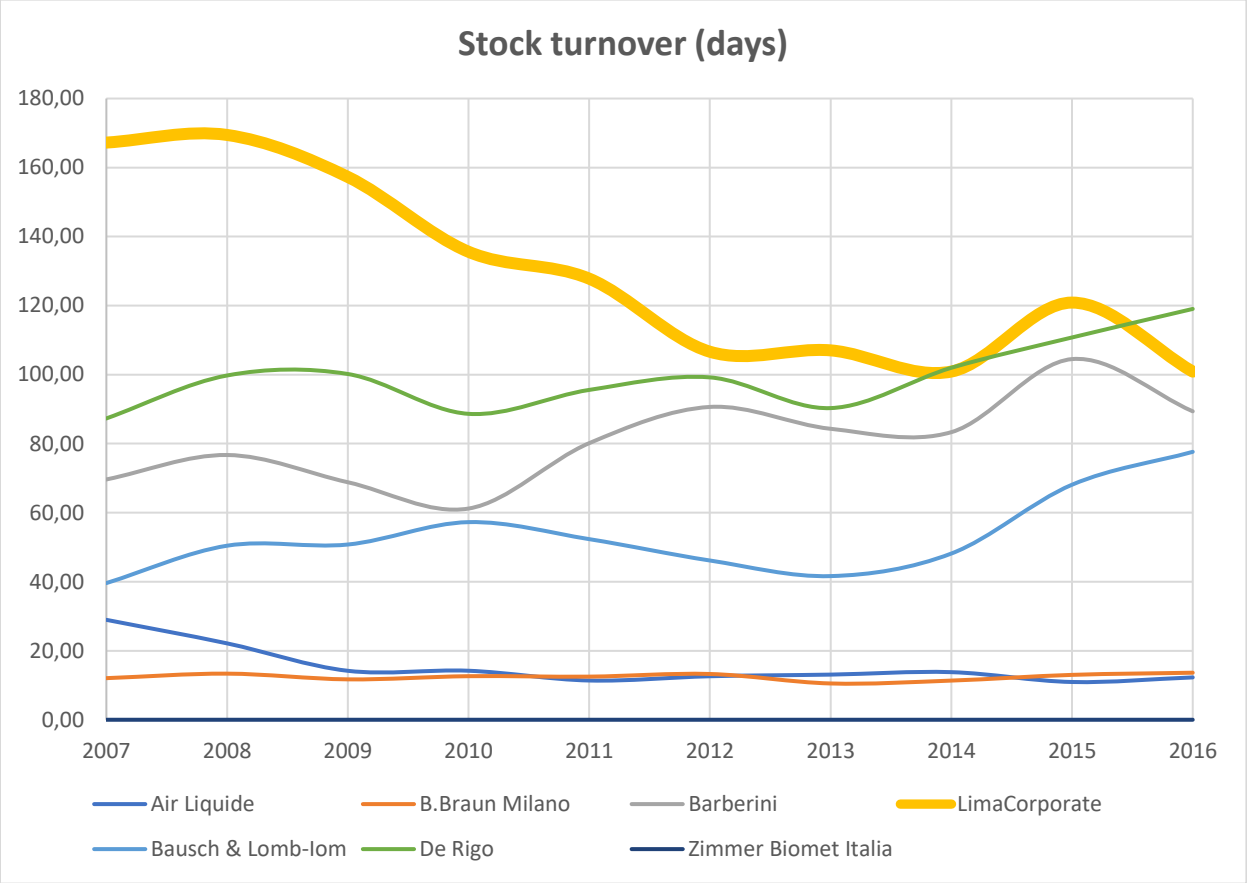


In the last exercise, shareholder funds were protagonists of a huge escalation, passing from €69 million to €356, thanks to the big surge (around €300 million) of the reserves; surprisingly, the capital is, stuck at €10 million, one of the lowest of the firms taken in example.

In ten years the value of production has gained more than €100 million, passing from the last position to the third one, with a growth which is bigger than all the rest; added value has performed a similar route, becoming the highest one in 2016, at €68 million. Costs of materials, after they doubled between 2014 and 2015, are now reducing, remaining among the shorter ones; on the contrary, costs of employees have grown up in a constant landscape, as number of employees, now overcoming four hundreds units, has done too. Operating P/L is usually the second best, with a positive peak in 2015, while P/L after taxation, due to elevate financial expenses, is negative, but only in that year, in 2016.



Indexes values are decreasing, with ROE being negative just in the last exercise for the reason previously explained; gross margin is decreasing too, but always staying in the first positions and with good results, between 70 and 80%. Stock turnover, huge in the first year of the analysis, is now falling and has reached the other highest of the peer, still remaining considerably big.



In conclusion, LimaCorporate has very good operative results, but negative economic ones in the last year; thanks to its dimensions and the recent improvement it is believable it will continue to rise in the next year, enhancing its position in the sector and passing from being one of the best to the first position.

Skorpion Engineering S.r.L.

Presentation

Based in Segrate (Milan), this firm was founded in the years 2000s and has pioneered the use of additive technologies, especially for the automotive sector, the first industrial sector to have understood the enormous advantages of rapid prototyping. Through a modular and flexible structure, the company offers a project management service for all phases of new product development by combining the most innovative additive manufacturing techniques with the traditional rapid

prototyping technologies. Its identifying ATECO code is 257320: “manufacture of dies, dieholders, templates, shapes for machines”.

The sector

This sector is growing alongside the diffusion of special machines.

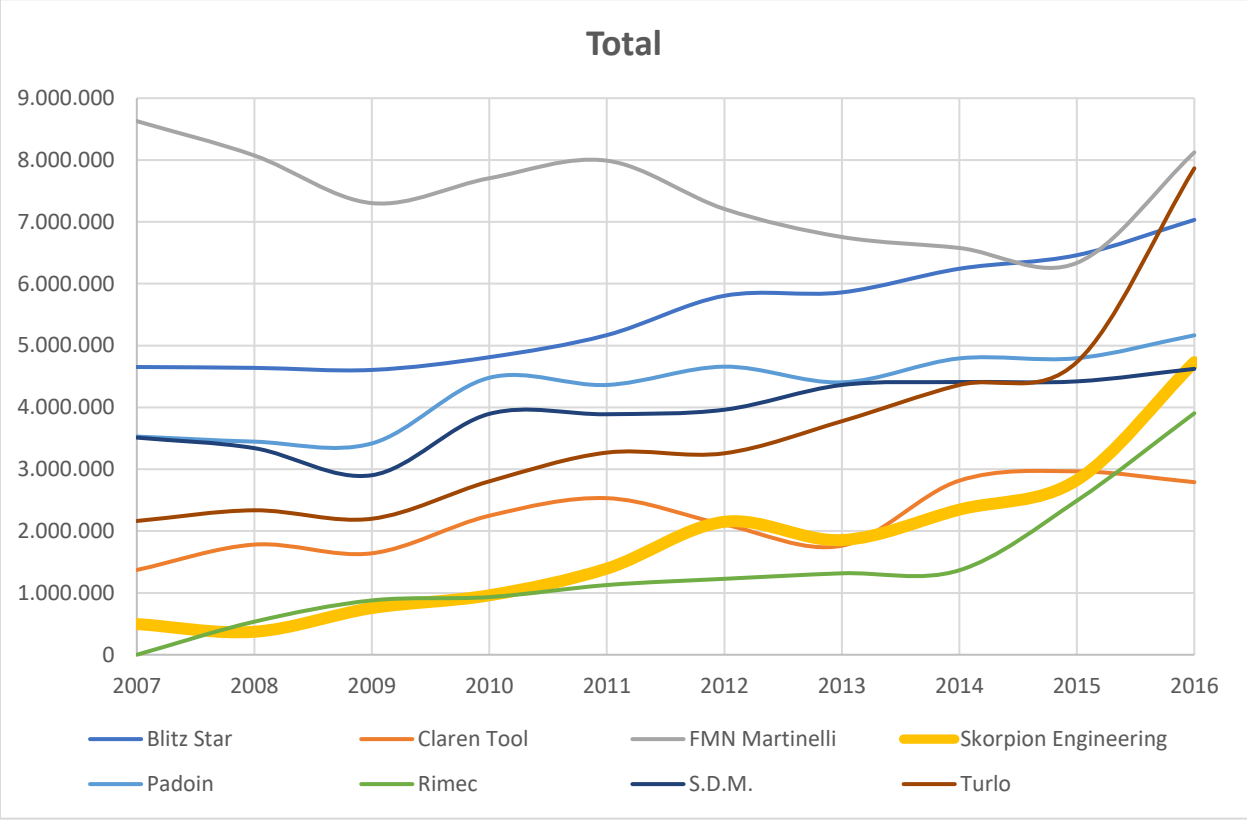
Peer	
Name	257 LA (Large companies)
Description	Manufacture of cutlery, tools and hardware items
Size	542 companies

Competitors

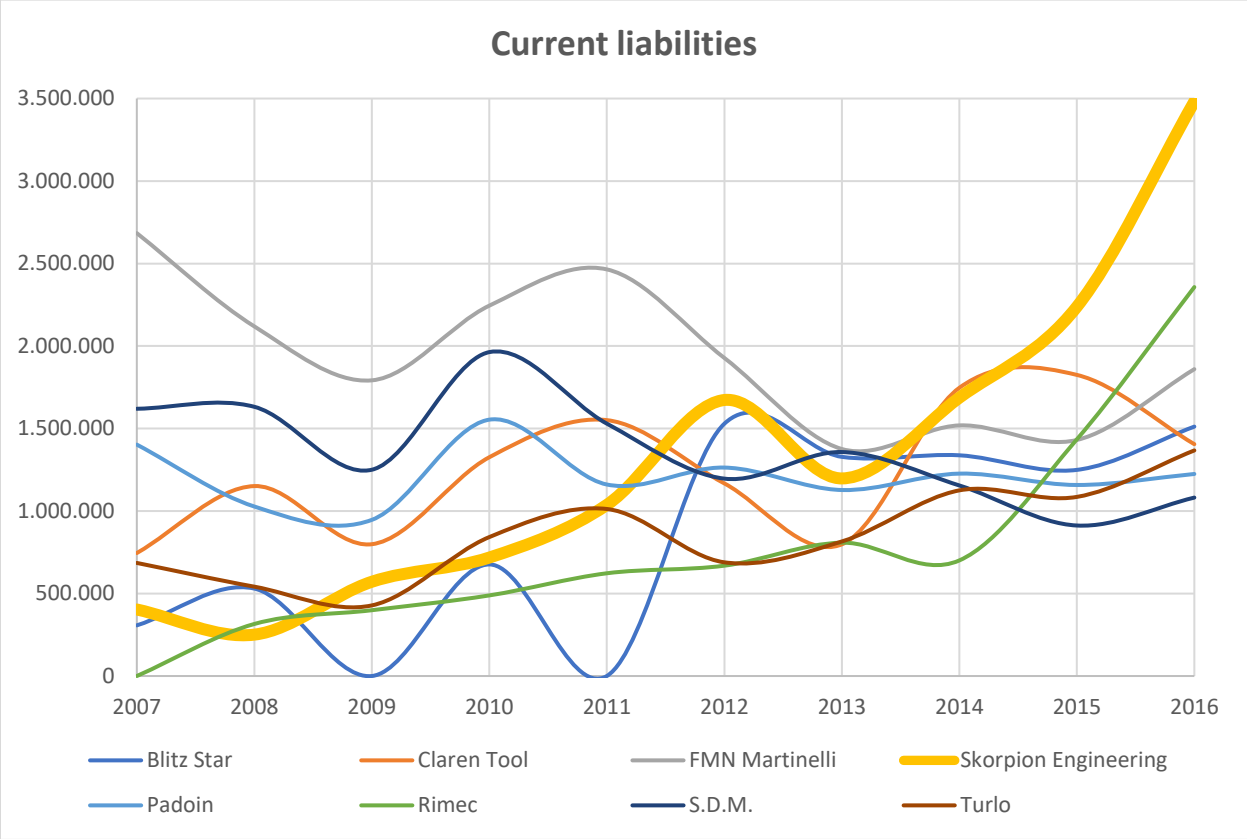
Companies	ATECO code	Description
Blitz Star	257200	Manufacture of locks and hinges
Claren Tool	257320	Manufacture of dies, dieholders, templates, shapes for machines
FMN Martinelli	257200	Manufacture of locks and hinges
Skorpion Engineering	**257320**	**Manufacture of dies, dieholders, templates, shapes for machines**
Padoin	257310	Manufacture of manually operated tools; interchangeble parts for machine tools
Rimec	257320	Manufacture of dies, dieholders, templates, shapes for machines
S.D.M.	257320	Manufacture of dies, dieholders, templates, shapes for machines
Turlo	257312	Manufacture of interchangeable parts for machine tools

Total assets have increased a lot since 2013, passing from the lowest positions to the average: this rise is led by both non-current and current ones, with the former ones having an higher relative expansion. Stock level, always null until 2015, remains very low, at €75,000, much shorter than the rest of the sector. The amount

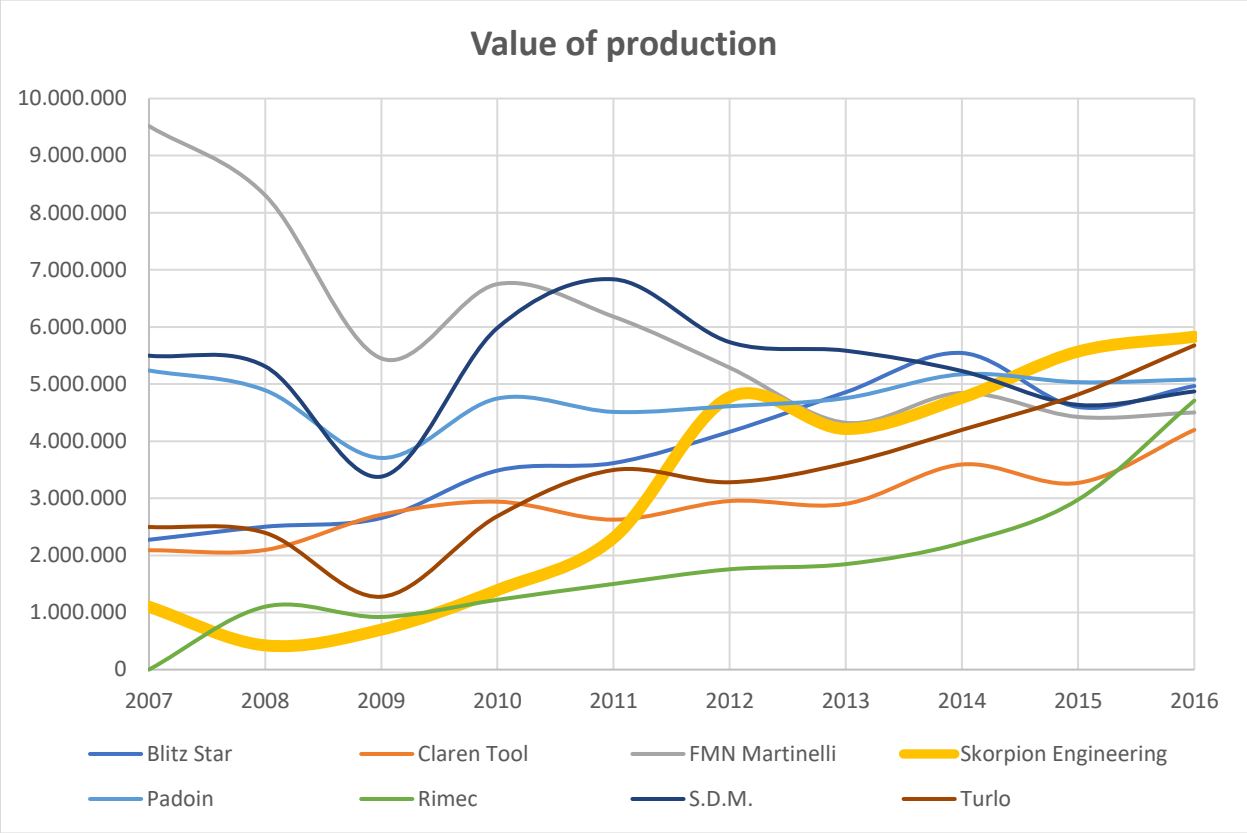
of receivable is considerable and generally the enterprise doesn't boast a liquidity situation as good as the other companies.



Shareholder funds, despite a capital of €290,000, the second highest of the peer, are very low but doubling between 2015 and 2016, thanks to the good results Skorpion Engineering is having. Liabilities in general are higher than the rest, with non-current ones being just above the average and current ones in the first position, with a considerable growth for both of them in the last period, symptom that the company is trying to enhance its business through the search of funds.



Value of production is largely augmented in ten years, passing from €1 million to €5.8 million, knowing the absolutely best boost between the firms taken in exam. Added value is passed from €79,000 to €1 million thanks to a big growth too, but is still among the lowest ones. Costs of materials have expanded a lot in the period taken in exam, becoming the highest biggest ones for more than €1 million over the second ones; costs of employees are risen but remain in the lower positions and depreciations, after a recent growth, are now stable. P/L results are always positive from 2008, but still lower than the majority of the group.



Indexes results are always positive, but they are still under the average, like P/L ones; gross margin fluctuates between 35 and 45%, less than the mean value of the sector. Stock turnover, unfortunately, is not available.

To conclude, Skorpion Engineering shows good results of productivity, improved in the last years thanks to the adoption of additive manufacturing, among the other things; on the other hand, economic ones are in augmenting but still lower than the rest of the group: it's believable that, using the new technique in the productive chain, the company will fill the gap with its competitors.

Conclusions about AM experts

This is the unique category in which is assumed that all the brands are strongly involved in 3DP landscape, emerging a clear benefit from its adoption. More in details, Jdeal-Form, LimaCorporate and Skorpion Engineering have quite good results and improvements, while CSP and EOS are really boosting their businesses, particularly in the last two years.

To go deeper, assets in general are increased (with the exception of Jdeal-Form), while stocks are in same cases augmenting and in other ones reducing; value of production and added value are probably the two more rising items, highly witnessing the important role of AM; for the two types of costs analysed there isn't a defined trend, whereas the number of employee is growing (in parallel to the dimension of the enterprises); finally P/L results are good almost everywhere. One more thing to state is that the improvements are quite concentrated in the last exercises, with the new technology already enhanced in the companies and with further perspective of growth for the next years.

GENERAL CONCLUSIONS

3D printing, which has been used for prototyping for over two decades, has been involved in the production of end-use goods for a few years. Despite the uncertainty given by an innovation that is still at the earliest stages of development, it is already clear that this is a wide-ranging technology with very important economic implications: production costs, production process efficiency and internal and external logistics for the company change. Some features of this new technology (e.g. freer geometries or lower variant costs) intrinsically connote this innovation while others (e.g. disappearance of economies of scale) must be verified in light of the next technological developments and verified on the basis of data collected in the field. The actual impact on logistics, on the organization of work, on the ecological footprint of productions must also be studied not only on the basis of abstract models but on the ground of empirical research, against real data. Moreover, only time will tell whether these technological innovations will determine an effective "democratization" of the production processes and new more distributed forms of research and development that fully exploit the potential of new relational models made possible by the network.

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