



Strategic Dossier 175 B
Spanish Defence Industry:
wealth, technology and
security

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Instituto Español de Estudios Estratégicos



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The objective of the report that you have in your hands is to offer a panoramic view of the future of the Spanish defence industry as a source of wealth, technology and security. It seemed to us opportune to approach the subject in a choral fashion, listening to the voices of all those who have something to say about the industrial activity that is analysed. Those, who with their different intonations, enable us to offer the inquisitive reader a vision of the whole. Starting out from an attentive and reciprocal listening to the different protagonists, it must be emphasized that the whole transcends the mere summing up of perspectives to offer what we see as a precise idea of the principles, interests and collective ambitions that motivate the 50,000 people who work in the group of Spanish technological industries that make up TEDAE (the acronym of the Asociación Española de Empresas Tecnológicas de Defensa, Aeronáutica y Espacio). They more than justify the consideration of this sector as being one that is strategic for the nation.

We start off with the voice of the companies that belong to TEDAE, which serves as an introduction, adding in an essential strategic view from Lieutenant Colonel Víctor Pujol de Lara. Then come the points of view of the Ministry of Industry, from the Secretary General for Industry and Small and Medium Size Enterprises (SMEs), Begoña Cristeto Blasco, and the Ministry of Defence, from the Director General of Armament and Materiel, Lieutenant General Juan Manuel García Montaña, and Deputy Director General of International

Relations, General Arturo Alfonso Meiriño; the trade union perspective from the Secretary of Industrial Strategies at Comisiones Obreras, Máximo Blanco Muñoz, and, finally, the academic viewpoint from a professor of Applied Economics at the Universidad Complutense de Madrid, Antonio Fonfría Mesa. Although we will return later to look at the chosen points of view, I want here to thank all those who generously accepted our invitation to take part in this report and take on their work with a rigour that I think the reader will corroborate. In any case, before moving on, I would like to highlight the fact that this is a collective task. In its humble way it enables us to keep faith in that being altogether we are much more, and show that reason, that can lead us to disagree, also leads us to coincide.

Some general ideas on the current situation of the Spanish technological industry will perhaps serve to encourage the reading of this report. As authors, we would definitely feel gratified if our work proves useful in looking at the subject, as well as being an easy, pleasant and instructive read. In this way it is an ambitious report.

As author Bernal Díaz del Castillo said in his book on the conquest of the Americas, «...I was always eager to be a good soldier, the one who was obliged to have, as such to serve God and our lord king, and try to win honour, just as noble men must search out a life and keep improving...». Convinced as he was, and he adds later, it is true what the adage says «... he who does, succeeds...»¹.

Or as Doctor Johnson said: “The reverence due to writings that have long subsisted arises therefore not from any credulous confidence in the superior wisdom of past ages, or gloomy persuasion of the degeneracy of mankind, but is the consequence of acknowledged and indubitable positions, that what has been longest known has been most considered, and what is most considered is best understood. ...»², that could well be applied to the need for collective security and its indispensable tool: a first rate technological industry.

Can our national security count on this avant garde technological industry? What is its essence and meaning? What is its future?

I’m going to start by saying that the Spanish security and defence industry knows exactly where it comes from; what it wants to be – that’s to say permanent – and where it wants to go, to be more efficient and competitive, in short, to grow. The facts support what I am saying.

¹ DÍAZ DEL CASTILLO, Bernal. «Historia verdadera de la conquista de la nueva España», *Galaxia Gutenberg/Círculo de Lectores*, Biblioteca Clásica de la Real Academia Española, Madrid, 2011, pp. 15 and 31.

² JOHNSON, Samuel. «Literary Essays. Shakespeare, lives of poets and The Rambler», *Galaxia Gutenberg/Círculo de Lectores*, Madrid, April 2015, p. 34.

Figures for 2014³ tell us that the Spanish technological industries as a whole (defence and security, aeronautical and space) had a turnover of 9.4 billion euros; that it provides direct, stable and highly qualified employment for 49,994 people, that it invests 10% of its sales in R&D and innovation; that 82% of its sales come from exports and that its productivity levels are three times the Spanish average.

If we look only at the figures for the defence and security sector – which only gives us a partial and insufficient view of the Spanish technological industry – we are talking of 18,805 people working in the sector. Their qualifications are higher still than those for the technological sector as a whole, with 40% of employees holding higher level qualifications, while in the defence sub sector this reaches nearly 50%. Investment in R&D and innovation represents 10% of sales, with 67% of turnover coming from exports and productivity levels that are 3.6 times the Spanish average.

As a whole it represents 1% of Spain's gross domestic product (GDP) and – what is perhaps more relevant – 5.5% of Spain's industrial GDP. What is more important, however, is that our industry has a very large and verified multiplier effect on economic activity in technological innovation. This has been demonstrated, for example, with the major armaments programmes, despite their various problems.

The Spanish technological industry has reached a high level. We are among the few countries whose companies can handle the complete industrial process: from innovation to production, deployment, maintenance... We have products, capabilities and competitive technologies in the areas of land, naval and air platforms, in electronics and communications, in armaments and munitions, in space... The structure of the sector is divided up among «primes», subcontractors and SMEs with our own products that enable us to head up complex projects, to participate in international programmes and to have competitive specialist niches.

To conclude, we are capable of doing many things well and we do not see any setbacks from this advanced position. If that were to happen it would be lethal for the future of our industry, for an open Spanish economy that is competing globally and, above all for a defence that would be left toothless if it were to lose a consolidated industrial base that guarantees supplies, reliability and technological advantages.

Nobody disputes that our industry is competitive and efficient, makes use of the investments made in it and generates economic, technological and social returns that represent enormous added value. But for our analysis it does not matter so much who we are, rather what we should be if we want to persevere in competitiveness and efficiency.

³ Source TEDAE (Asociación Española de Empresas Tecnológicas de Defensa, Aeronáutica y Espacio), which published the figures recently.

The process of major acquisitions in the so called Special Armaments Programmes (PEAs) and the policy of compensations in the last 20 years has been fruitful. They have proved to be an extraordinary opportunity for training, but at the same time they created an excessive dependence on internal demand and excess supply. A new cycle has begun that we have to adapt to, and that adaptation is urgent.

Exports, one of the strengths of the sector, have concentrated too much in two ways. On one hand they are essentially dominated by the 10 largest companies. On the other, they are concentrated in the European market around cooperative programmes and also, as a consequence of this, with state investment. At the same time export success has its roots and its risks in a significant reduction in internal demand, both domestic and European, during the years of crisis. What is evident is that we should always be paying attention to innovation and the opening up of new markets.

Moving on from this, what we are seeing is that:

1. Demand has contracted as a consequence of the effects of the economic crisis and the need for fiscal consolidation. We understand this and have shown demonstrations of our commitment, for example through the rescheduling of programmes. But this is a circumstantial factor and we hope that in the immediate future demand will progressively recuperate as soon as it is economically possible. We are aware that industry's mission is not to incite demand but to serve it. If countries think, for example, as they demonstrated at the recent NATO meeting held in Cardiff, in Wales, that investments in defence should be increased to 2% of their GDPs to respond reasonably to the necessities of our collective security in the current circumstances – in which we cannot hide from an increase in risks and threats that appear with insistent frequency and growing clarity on our news programmes- we can ask them to turn their declarations into reality. Then they can also be asked to bring in regulations that ensure the medium to long term financial stability of defence budgets. This in turn signifies medium to long term stability for an industry that is recognized, among other things, for its spending on R&D and innovation and for a long maturation period on investments and getting a return on those investments.
2. All the indicators point to the start of an economic recovery in which we want to contribute within the measure of our possibilities which, as mentioned before, are many. It will not be possible to reach European and national goals of reindustrialization, as highlighted in the Horizon 2020 programme of innovation and investigation and in the Strategy for Intelligent Specialization (RIS3), in the Guide for the consolidation of Spanish industry or in the programme Industry 4.0, without counting especially on the defence and security industries. In reaching that level of collective success lies the possibility

of the future success of our sector, whose contribution, we repeat, is essential.

3. We want to be able to compete freely and on equal conditions in the global market. Not only because the reduction in domestic demand obliges us to do so to survive, or that a European defence market is starting to materialize on the horizon, but also because we live in a global market that demands we adapt. You have to have excellent products, but you also have to gain markets and clients for those products, as our competitors are doing. Orienting innovation to the market is now not only a necessity but commonplace. As Roman emperor Marco Aurelio said, as Antonino his homeland was Rome, but as a man his homeland was the world. We are Spanish industry, but we want to, we can and we must think globally; our market is the world.
4. We see new competitors, new threats to our market; disruptive technologies appear, etc. Summing up: volatility, fragility, the acceleration of change in scenarios and circumstances, complexity. The only recipe to confront this complexity is to be flexible and capable of anticipating. The future is always for those who think more, think ahead and think better.
5. We see the advance of European regulations, the opportunities represented by innovation funds and the new framework that is emerging for the defence industry. We want to contribute to decision making and the collective effort from the start, while at the same time we defend our legitimate interests.
6. We see how the dividing lines between defence and security blur: exterior and interior; civil or military research, development and innovation. These offer us opportunities and potential growth in demand that we do not want to give up.
7. We see asymmetry in the transfer of competencies from Member States to the European Union. They are accelerated in the financial sphere without the process culminating in known consequences. But they are slower in questions of defence, which clearly go right to the heart of sovereignty. At the same time the crisis has highlighted the difficulties, if not the impossibility, of sustaining in the future essential investments in defence and in R&D and innovation without close European cooperation. The best way of making a European defence industry is through European Cooperation Programmes. These should be the basis for innovation and of future export programmes. That is what European industries have made known to heads of government and Ministers of Defence in a letter sent recently to the European Council.

Added to what we see here are some structural characteristics of the sector that are well known. Firstly, states have a double role in our market, as regulators and clients. And, not necessarily unique, but certainly

more than significant, sometimes also as shareholders. All this supposes that any future strategy must take this factor into account. It is clear, for example, that national references facilitate exports and a lack of them tends to make exporting difficult or impedes it.

Secondly, for companies our strength or our weakness is in our financial balances, the bottom line that has to be in black because our *raison d'être* is the generation of wealth. This translates into the creation of jobs, the payment of taxes and the development of technological and state of the art industrial capabilities, among other things. This may appear an elementary idea, and maybe it is, but not accepting this is to not understand it and it must be said.

All the above leads us to think that the structure of the sector should change to be successful in the future, built around some guidelines like those that follow:

1. It is essential to prioritize and to specialize. Shooting in all directions at the same time is a guarantee to miss the mark. That in turn leads us to fail again because the speed of the objectives is not going to make a second opportunity easy. Preparing adequately to take an active part in the processes of industrial specialization and regional share-out that are being carried out in Europe is vital, and we are lagging behind.
2. We have to pay special attention to our financial muscle and the composition of our capital structure. Public financing, which is still essential in many aspects for reaching the next technological jump and incorporating it successfully, cannot play the same role in the future. What is demanded of us is to attract capital based on the proven profitability and efficiency of our industry. There are obvious risks, from one side or the other, without adequate controls. These controls, as it is obvious to say, are in no way incompatible with global competition. What is necessary is that the rules are the same for all. Or, to put it another way, we do not see why if competitors protect and defend their markets we cannot do it. We must do it, because any industrial relations based on reciprocity and mutual confidence will help all of us to grow. Naivety would make us simply disappear, although not all.
3. The global competition and industrial share-out that is seen in Europe as a consequence of the process of specialization determines that only business structures that are profitable, flexible and directed towards innovation and fall in line with a state's industrial policy will survive in the future. So, logically the Spanish industrial sector must direct itself at these goals. This assumes many things: gaining size, while at the same time protecting ourselves and promoting the value chain; letting in new efficient operators with a future in the market; eliminating inefficiencies; adding capacities, joining forces,

etc. The objective, which companies have to execute in the best way possible, is as clear as it is pressing.

So, we have the adaptation to change to which the Spanish technological industry is committed to maintain the level it has reached, growing in size and profitability and continuing to compete in the new scenario, while at the same time contributing to national, European and global security and defence through the alliances and other structures in which Spin is integrated.

Let it be said, however, that the participation of States in the sector, and in particular in the subsector of defence, is decisive in many ways. That is why I would like to express what the industry, whose vision and commitments I have just set out briefly, expects in return from government. This can be summed up in three words: clarity, speed and continuity.

Clarity in the strategies and contractual procedures and putting into practice the structural reforms and procedures that are linked with them and are under way. Clarity in the determination of the industrial sectors and strategic technological areas in defence and security, as well as in the specific industrial plans of support for reindustrialization and R&D and innovation, in financial tools, and in plans for acquisitions and maintenance.

Clarity in defending the interests of Spanish industry, managing the conditions that allow global competition without advantages; but in equal conditions with our competitors. As an example, there is the recent Royal Decree dealing with the regulation of Government to Government exports or the Cabinet agreement on strategic capabilities that enable us to know their demand and to make decisions aimed at meeting their approval.

Clarity even where there is disagreement or criticism, because high-handedness is always sterile, as well as being discourteous. We want to make the most of things by learning from our mistakes and in doing so benefiting the performance of the team, which is Spain.

In second place, speed. It is simply a demand of our times. We know, as industrialists, the difficulties of resisting change. And, what is worse, the risks, among which stands out disappearing through obsolescence. It is obvious that we are not asking for improvisation, another ill of our time and the mother of all regulatory risks, but yes, speed. Because speed does not exclude reflection, but it does passiveness.

Lastly, continuity. The security and defence industry works on projects that have long maturation periods and where the recouping of investments is very long. This means that orders and counter orders not only give rise to disorder, as is well known, but also

disaster in the form of financial problems, bankruptcy or the disappearance of suppliers.

Spain, as a country, needs to decide which type and size of defence and industry it wants and can have, that conforms with its security needs and its industrial and financial capabilities. As a European state it also needs to determine the role it wants to play in the European Defence Technological Base (EDTIB). We have already taken some steps in this direction with the approval of the so called Capacidades Industriales Estratégicas (CIEs) and we must continue this effort, transferring that strategic decision to the field of plans and programmes and establishing a framework of industrial action that serves as a reference point and helps companies to make the right decisions.

In some industrial sectors, like the automobile one, Spain took a strategic decision and wheeled out all sorts of plans and financial tools, including labour regulations, to develop a sector that took on a role in the value chain and sought competitiveness through innovation and production efficiency.

You only have to look at the countries around us to see that the ones in which the alliance between industry and government in defence materiel is stable are those with the most success in both fields. One example, which will no doubt be continued, is the workshop organized by the Ministries of Industry and Defence at the end of 2013, which shows the best road to take.

But, as has already been said, what is important is the future and to look into it. It is not enough just to look at the views of the companies that have been laid out up until now. It is necessary that all the leading players in this transcendental sector give their points of view. Otherwise the view would be incomplete. That is why I referred to a choir at the beginning.

A strategic perspective is today fundamental for decision making in any company in the global economy, even more so when we are talking about the defence industry. The chapter handled by Lieut. Col. Pujol will provide a global vision of defence in general and the industry in particular, in the current geopolitical framework. This framework is marked by a proliferation of risks and threats that are in continual evolution: the lack of geopolitical definition in numerous regions of the world, economic globalization etc. These factors are relevant for defining a defence industry strategy. In this situation of uncertainty, states battle to design, develop and sustain a geo-strategy that covers present and future challenges to their security, both collective and non-shared ones. Naturally, a basic ingredient of any security strategy is the development of a de-

fence industry strategy that synchronizes with national interests and military needs. The existence of divergent needs and the wide spectrum of threats to be covered means the objective is not easy, but it is fundamental and inescapable. A competitive and modern industrial base is an essential component, if one wants to remain relevant internationally and maintain the security and welfare of citizens.

Secondly, we are talking, obviously, about industry and industrial policy. That is why we need to have the point of view of the Ministry of Industry, as a leading player. This is the contribution of Be-goña Cristeto. For her Spain needs to promote development of an industry that is strong, competitive and represents an international benchmark, a lever for growth in the production system that drives the recuperation of our economy and the creation of jobs. The current Spanish industrial policy is governed by the «Agenda for the strengthening of the industrial sector in Spain », which contains a series of concrete and well defined proposals. These are enabling us to improve the conditions for developing industrial activity in Spain, contributing to the growth of the industry, making it more competitive and increasing its importance in the gross domestic product.

Thirdly, it is important to have the view of the client. The answer to this focus can be found in the chapter from Lieut. Gen. García Montaña. For him, in addition to procuring the best weapons systems possible for our Armed Forces, the General Directorate of Armament and Materiel is trying to boost the consolidation of an industrial and technological defence industry base that is capable and competitive, one that will provide our country with freedom of action, operational advantages and the security of supply necessary to exercise our sovereignty.

To enable this to happen, a profound transformation has been carried out, with the centralizing of programmes for procurement, modernization and common support, as well as boosting the Office of Foreign Support which is dedicated to institutional support for companies in the defence sector. Strategic industrial capabilities were laid out recently by the Cabinet and work is being carried out on an Industrial Defence Strategy.

All this, together with the revision of the Strategy for Technology and Innovation in Defence, makes up a reference framework that enables companies in the sector to orientate their efforts in the direction that Defence needs.

Without the institutional support that Lieut. Gen. García Montaña refers to, exporting would be much more difficult. As we pointed out at the start of this chapter, it needs to begin with a profound

knowledge of the international scenario in which the industrial activity is taking place.

A reflection on this is given in the chapter presented by Gen. Alfonso Meiriño who believes the economic and financial crisis of the past 10 years has forced countries to rethink their models for managing defence matters. In particular, the management of military capabilities has taken on an important international component both in planning and in the way they are acquired, and the industrial strategies of the sector.

The main supranational benchmarks for Spain in the international defence framework are the North Atlantic Treaty Organization (NATO) and the European Union (EU). Each one, from its own perspective, now has a greater protagonism in the various processes related with obtaining military capabilities. The traditional concept of national sovereignty for defence matters is being revised. The European Union, in particular, is emerging as a new regulator of the defence market, a function until now in the hands of the individual states.

NATO and European Union initiatives for the harmonization of capabilities -Smart Defence and Pooling & Sharing- have emerged in the face of an economic scenario that clearly has a negative effect on the defence effort that Member States should be maintaining. They are an evolution of the principle of cooperation and mutual support on which both organizations are based. The principles associated with these initiatives are innovative models with important implications in terms of sovereignty, the economy and advanced technology, in the marketplace and in the industry.

The way in which we get involved, both at government level and that of Spanish industry, in these new management models for military capabilities that are developing within an increasingly regulated supranational market and one that is ever more competitive globally, will be decisive when it comes to defining and obtaining future military and industrial capabilities. Therefore, they will play an important role in Spain's weight in the international sphere in general and the defence field in particular.

The previously mentioned points of view need to be complemented by two others. In first place is the economic one. In his chapter Professor Fonfría will give an analysis of the principal economic and financial problems in the acquisition of major arms systems. To be very concise, the basic problems can be found on both the demand and supply sides. The key question is in identifying a series of possible solutions that get round the obstacles to efficiency in the process. Factors such as the lack of clear financial perspectives, the costs, inefficient collaboration or types of contract are the source of financial problems that may limit the value they provide for society in return for the money that is invested.

In second place, there is the view of the trade unions, of the people working in the defence industry, one that is undoubtedly very important. As Máximo Blanco explains in his chapter, European trade unions are demanding from the Commission an action programme that guarantees maintaining key industrial capabilities in Europe. This would be done through investment policies that encourage solid European production, combining objectives and national and community resources, from both the financial and industrial and technological points of view, because the effects of these policies are decisive.

In Spain, the trade union Comisiones Obreras de Industria has for years been declaring that what the country needs, in addition to a state defence policy, is an action plan for informing society of the role that this industry plays in benefitting the economy, technological development, employment and the welfare state. And that this implies the need to promote industry in general and the defence and security sector in particular.

To end this introduction I am going to be bold in drawing some conclusions and expressing some wishes that, with the nuances of tone from each of the voices put forward, will I think sum up the criteria of all the authors.

The defence industry is a matter of state. It is as a substantial element of collective defence, in which efficiency demands far reaching and broad vision programming and is shared for the benefit of all. This excludes improvisations and sudden, impulsive short term bursts. It requires efficient collaboration between the state and companies, each with its own role and which should not be confused. Thinking especially of the future, it needs a stable financial structure for the medium term that facilitates and orients the investment effort of the companies. Summing up, as I said at the start, it requires faith in that together we are much more and those that disagree could come to agree.

I hope we are capable of answering the needs that are voiced. I think a lot rides on it, just as I hope that Spanish society understands the relevance of the defence industry as a source of wealth, technology and security.

A geo-strategic view of defence

Víctor Pujol de Lara

Chapter one

Abstract

This chapter aims to provide a geopolitical and strategic overview of the dynamics, factors, circumstances, risks and threats, etc., that affect and frame defence issues in general and the defence industry in particular. It includes a review of such important aspects as globalization, the definition of risks and threats, the changing concept of security, the geopolitical complexity of our region, etc., to try and explain the difficulties that exist in defining the security policies of any state, and the corresponding defence industry strategy.

These difficulties should not obscure the usefulness and necessity of maintaining a defence industrial base, capable of facing the challenges to national security, especially those arising from the proliferation of armed conflicts.

Keywords

Geopolitics, geostrategy, strategy, defence, industrial base, risks, threats, security, armed conflicts, national defence.

Introduction

When General Ballesteros, director of the Spanish Institute of Strategic Studies (IEEE), called me into his office to ask me to write a chapter for this strategic study, the first thing that came into my head was my total lack of knowledge on the matter. Ignorance about a subject of great importance; that fortunately will be explained in detail in the following chapters. Talking about the defence industry is a subject for a specialist in the subject. However, Gen Ballesteros convinced me, providing me with a series of ideas about how to focus my work. Not as a specialist, which I am not, but as an officer in the Chief of Staff's Office with some knowledge of geopolitics and strategy. That is to say, from the point of view of a generalist. At the end of the day, talking about the defence industry – reduced to the basics – means speaking about the arms systems that the Armed Forces need to carry out their missions and the importance of the industry that supplies them. What convinced me in the end was remembering the verses of Calderón de la Barca, which every Infantry unit recites when they run.

«Here the most singular threat is to obey, and the way to deserve is not to ask, nor to refuse».

Another reason that helped in my decision was remembering a phrase attributed to President Ronald Reagan, who when confronted by journalists would say: «What questions have you got for my answers?».

In short, this part of the strategy study is the view of an Infantry officer, one who became an officer in the Chief of Staff's Office, a fan of the classics, military history and strategic studies, who has focused on the subject in a very particular and personal way that contrasts with the specialist focus in the other chapters.

Given that the title speaks of the geo-strategy of defence, the intention is that the content relates to geopolitics, strategy and defence issues.

For Saul B. Cohen, geopolitical analysis focuses the attention of politicians and statesmen on the conditions that are most likely to trigger geopolitical change¹. Staying with this author, he considers that geopolitics is useful as an analysis of the geographical factors that in some way affect international relations and steer political interaction. If we add to this the word 'strategy' we could say that geo-strategy is the art of a strategy applied to a specific geopolitical setting. If geopolitics, in spite of being dynamic, can be studied on its own, to speak of geo-strategy requires an adversary or at least a competitor. It is no more than a strategy in which the geograph-

¹ COHEN, Saul Bernard. *Geopolitics: The geography of international relations*. Lanham: Rowman & Littlefield, 2015. p. 1.

ical factors and the geopolitical surroundings are seen as being of maximum importance or have a major influence or relevance.

If, for example, we speak about the geopolitical region of the Middle East, countries with a global reach such as the USA could have a geo-strategy that applies to this determined geopolitical region, and a specific geo-strategy will pay special attention to incorporating a good geopolitical analysis.

Also, if we are speaking about defence, we are speaking basically about what the Armed Forces do. The defence industry, therefore, is the one in charge of supplying the capabilities that are necessary for the Armed Forces to fight and defeat or dissuade in armed conflicts or to maintain the balance of power in crisis situations. Although these days everything seems more complicated than it really is, it can be summed up in the old saying of Flavio Vegecio Renato, blurred now on the lintels of old barracks. It reads «Si vis pacem para bellum», but in his book *De re militari* or *Epitoma rei militaris* really says «igitur qui desiderat pacem, praeparet bellum». In short, dissuasion as a way of keeping the peace.

In the good times of the Cold War experts on the subject spoke of nuclear dissuasion. Therefore peace was maintained thanks to the doctrine of «mutually assured destruction (MAD)». So it should come as no surprise that the concept of security was closely linked with the counting of nuclear warheads and beyond the merely military². In the contemporary world nothing is so clear and the profusion of experts, essayists, institutes of strategy and a host of charlatans make it very complicated to distinguish the wheat from the chaff.

If one agrees with the concept of strategic culture, one can speak of a western way of making war. According to Geoffrey Parker, the western way of making war rests on five principles³:

- Western Armed Forces base their superiority on technology, normally to compensate for their inferior numbers.
- Western military practise is based fundamentally on discipline, above other military virtues.
- Another factor is the continuity of military thinking, reflected in the doctrine and western strategic thinking.
- The dynamic of challenge and response. Determining the capability of adapting to new threats, as exemplified by military innovation.

² Although strategic studies were dominated by civilian analysts from different academic disciplines.

³ PARKER, Geoffrey. *The western way of war. Illustrated History of Warfare*. Cambridge: Cambridge, 1995, pp. 2-9.

- Lastly, the expansion of the west has historically been by military means, thanks to the military superiority afforded by continual innovation.

In conclusion, it can be stated that technological superiority, as demonstrated in the western way of making war, is an element to be maintained. That is if one really believes in a view of the world based on respect for International Law, especially Human Rights, democracy and liberalism, is for the most part the fruits of a long journey forged by war and the sue of arms over the centuries. Or as Don Quijote⁴ put it in his speech on arms and the arts:

«Arms respond to that which the laws cannot sustain without them. Because with arms one can define republics, conserve kingdoms, guard cities, ensure the safety of highways, clear the seas of corsairs and, finally, if it were not for them, the republics, the kingdoms, the monarchies, the cities, the rights of way over sea and land would be subject to the rigours and confusion that war brings while it lasts and has license to use its privileges and its strengths. And it is established reason that what costs more is valued and should be valued by more».

This technological superiority, which has been a continuous motor for change in the west, is in doubt and threatened by various factors - sociological, economic, political, industrial, demographic, etc. One of the symptoms is the continual reduction in American and European defence budgets. This is despite the security situation, the risks and threats that multiply and the fact that the alternatives to western hegemony are international state actors with little to recommend themselves, such as China, Russia, Iran (or a combination of them) or a return to barbarism as advocated by international terrorism.

This chapter aims solely to demonstrate in the first part the geo-strategic framework in which defence in general and the defence industry in particular are involved. The second part, after presenting the characteristics that may define this framework, will look at defining the relationship between strategy, security and military capabilities. It will also set out briefly who buys arms, who sells them, and why. Lastly, it will present some conclusions.

A good start to this work is the end of Cold War and the fall of the Soviet Union. In the bipolar world preceding this historic event, the ideological confrontation between communism and capitalism had important geopolitical repercussions that were defined at military level by the proliferation of proxy conflicts and the parallel arms race between the two great blocs. This arms race led to a very prosperous and oversized defence

⁴ DE CERVANTES SAAVEDRA, Miguel. *Don Quijote de la Mancha*. RICO, Francisco [ed.]. Madrid: Instituto Cervantes, Crítica, 1605. p. 447.

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industry that grew gradually. Another characteristic of the industry was its permanence, even in times of peace.

The end of the Col War stimulated a search for the dividends of peace. The initial geopolitical optimism led to a belief in a «new world order», based on a system of collective security provided by the United Nations, the triumph of democracy and the «end of history» as a result of the victory of liberalism as an ideology and as an economic system. In this environment, the logic behind the arms race weakened. The United States, Russia and Europe, all found themselves with a defence industry much bigger than the market, a changing and decreasing perception of threats to national security, a big cut in defence spending and the start of an époque of uncertainty and disorder at geopolitical level.

Security during the Cold War was seen basically as defence and the threat was clear and identifiable. For some the Soviet Union, and for their communist adversary it was NATO, led by the USA.

In those days the focus of security, the balance of power, was established by using a parameter of the number of arms of each type that your opponent possessed. All this, clearly, within the framework and under the umbrella of a strategy of nuclear dissuasion and the parallel arms race.

The Cold War was not fought in Europe, although it kept the armed forces of both blocs at a high level of preparedness. This preparation required a large number of arms systems. And the planning, development, manufacture, maintenance, modernization and replacements needed the development and maintaining of a permanent defence industrial base.

For nearly all the Cold War the main strategic problem for NATO was in deciding how to counteract the Soviets' conventional arms superiority and dissuade the Red Army from attacking, without leading to the destruction of Western Europe. The initial strategic response was led by the Americans' monopoly of nuclear arms and the so-called «Massive Response» strategy.

The way to counteract the number of Soviet tanks deployed and ready to reach the English Channel was dissuasion through the use of nuclear weapons. This strategy, based on nuclear arms, created a dangerous precedent. This is not the place to go into detail about the changes in the Allies' strategic concept during this period, but it is to give a few brush-strokes to show how the changes on each side in strategy for a possible war – the main theatre for which would have been the central European plain – contributed to the arms race, both conventional and nuclear.

For NATO, the use of nuclear arms to counteract Soviet conventional superiority was replaced over time with the development of ever more advanced and technologically superior weapons, along with the adoption and development of operational techniques. Nuclear arms remained on

the sidelines thanks to the expansion, arms control, and nuclear dissuasion through the adoption of the strategic concept of «mutually assured destruction. In short, the strategic challenge posed by conventional Soviet was solved through technological superiority, especially in air power, the development of intelligent weapons, advanced command and control and an operational doctrine based on getting the best possible advantage out of this superiority. This marked technological superiority was demonstrated outside Europe, in the Golan Heights, the Sinai Peninsula and finally in Mesopotamia during the Desert Storm campaign of 1991. While in the west the armed forces gradually turned professional from 1973 onwards, in the east conscription and 'the masses' was maintained, influenced no doubt by Russian strategic culture and communist ideology. In the USA, the professionalization of the armed forces was a logical consequence and a functional necessity, linked to the giant qualitative leap forward provided by western arms systems, ever more costly, complex and more difficult to operate and maintain.

It is rather ironic that the great conventional technological superiority of the west has led to the development of asymmetric threats (or hybrid in more modern terms) by non-state actors and hostile governments, and a return to the threat of nuclear dissuasion on the part of states such as Russia and China, which have seen on numerous occasions how conventional armies equipped and trained in the Soviet style have proved to be excellent targets for the shooting practise of western armies, equipped and trained in the American way. Because of this, to a certain extent dissuasive logic has been inverted, in that nuclear arms are being used to counter western technological superiority. It is necessary to highlight that the West's technological superiority has guaranteed dissuasion and that wars between states – the most destructive ones – have become more a memory of the past than realistic.

From this starting point, the period following the Cold War, with the legacy of an oversized defence industry and a military security concept built on defence and dissuasion provided by conventional and nuclear arms, the factors that define the strategic defence framework of present times began developing.

The geostrategic framework of defence

A series of circumstances, characteristics and phenomena make up the geostrategic framework in which the contemporary defence industry has to operate. The framework is important for not losing sight of the determining factors, theories, geographical circumstances and policies that in some way affect decision-making in the fields of security and defence.

Firstly, one can speak of a convergence between the terms security and defence. Along with this, the concept of security has broadened to encompass other objects of reference different from the state and in the use of other ways and tools different to military ones.

The complex phenomenon of globalization, with its multiple definitions and much discussed effects, has also deeply affected issues linked to security in general and the defence industry in particular.

During the Second World War other industries were converted to manufacture arms for the United States and other countries such as the United Kingdom and the Soviet Union. Today a company that makes aluminium frames or electronic components cannot be transformed overnight into a modern armaments one. A military industrial base has permanence. Industrial capabilities have developed over decades and if abandoned are difficult to recoup. Also, there has been a proliferation of dual use technology and a continuous transfer between military and other industry. At the same time, the military and security industry has gone through a concentration process to ensure its survival.

Defence has to survive in a socio-political climate that could be defined in some cases as hostile. This difficult context is most marked in countries where the defence industry is most developed, in Europe at least. Disarmament, arms control, peace movements, the lack of an obvious threat, new security concepts such as human security, the lack of a 'defence culture' etc., do not contribute to promoting a favourable climate for maintaining industrial capability in this sector.

Threats to security are more widespread, heterogeneous and more dynamic. Societies seek and understand security in another way and try to respond in non-military ways. In Spain, any cuts in other areas of the budget such as education and health prompt a furious, immediate and widespread response. However, cuts in the defence budget generate minimum interest, aside from the few specialists in the subject. Although the military as an institution is highly regarded, opinion polls show that people do not believe money should be invested in defence.

Even when there are identifiable threats and risks, the armed forces, think tanks, strategists and statesmen are often incapable of fully determining the military capabilities that are needed to confront them. Given the long periods of time needed to conceive, develop and deploy modern arms systems, it is not uncommon for armed forces to have to fight with arms systems and doctrines designed for other époques, other adversaries and other wars. On top of this, there is the historical tendency among military institutions to adapt slowly to change. This institutional resistance to change is also connected with structural and organizational reasons.

The principal *raison d'être* of armed forces continues to be deterrence and the defence of vital national interests through the use of force. To do this they have to be prepared to fight or take part (in peace operations, for example) in all sorts of armed conflicts. Current armed conflicts are mainly internal ones, what under International Humanitarian Law are referred to as Non International Armed Conflicts (NIAC). The type, duration and intensity of these cover a wide spectrum of violence and adversaries. That is why the military capabilities of the armed forces have to be developed, to cover a wide range of possibilities. These military capabilities need to be oriented in the first place towards the projection of that security beyond a country's own frontiers.

If one does a quick review of the recent history of Spain, during the present and past centuries, from the Civil War of 1936-1939 onwards, the Spanish Armed Forces have always intervened outside the country's frontiers and in all types of operation. From the last flick of the colonial tail in Ifni and the Sahara, to the deployment of a division of volunteers in Russia (the famous Blue Division), and since the 1990s in a large number of operations - referred to by the misleading term 'peace' (more for psychological and political reasons rather than real ones) - that have marked the professionalization of our Armed Forces.

The geopolitical framework is dynamic, many sided and indeterminate. The step from a bipolar to a short period of a single pole world after the fall of the Berlin Wall was connected with a series of conflicts such as the breaking up of the former Yugoslavia and the one in Somalia. It is, therefore, very difficult to determine the appropriate security strategy without a grand geopolitical view of the world. The move from a bipolar world to a multi-polar one is generating a series of additional geopolitical tensions that are multiplying the risks and threats that face us.

European countries and international organizations, such as the European Union, have not been able to design, develop, apply and maintain a defence industrial strategy that is coherent with national or shared interests and their national and collective security strategies.

The economic crisis, which began in the USA, has weakened not only the economic capacity of western countries but also their political will. Defence, of course, has been one of the sectors most affected by the cuts. It is something that makes sense perhaps in the case of the USA which, in spite of recent cuts continues to be the world leader in defence spending. In other countries it may indicate the lack of commitment to security and defence, or simply that many modern statesmen lack the most elementary strategic education or defence culture.

The military response of the United States and its allies to the attacks of 11 September, the so-called «global war on terror» (GWOT), with its two main campaigns in Afghanistan and Iraq, has put into question strategic con-

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cepts based on superior technology such as the RMA, the Transformation and other similar ones. The debate remains open between those who propose preparing for possible conventional wars in the future and those who believe in having to take on firstly the current irregular armed conflicts. Beyond that debate, the lack of acceptable results in Iraq and Afghanistan has put into question the use of the military tool. The results of these interventions weigh heavily on the international will to intervene in conflicts such as that in Syria. However, the military tool is still decisive when appropriate strategy is combined with superior doctrine and technology.

Globalization and the defence industry

Globalization has also affected the ability of countries to manufacture armaments. Countries have traditionally regarded their autonomy to produce arms as a symbol of their sovereignty, of their international prestige, of their technological and industrial capabilities, and a key element in their security. According to Marc Devore ⁵, even small and medium size powers try to get on the production ladder, moving from being mere consumers to producers of arms. Devore says there are three processes connected with globalization, which combine to make it difficult these days for such countries to satisfy their defence and security needs. These are the increasing cost of arms, the competition between the major multinational arms companies, and, lastly, the internationalization of the components supply chains.

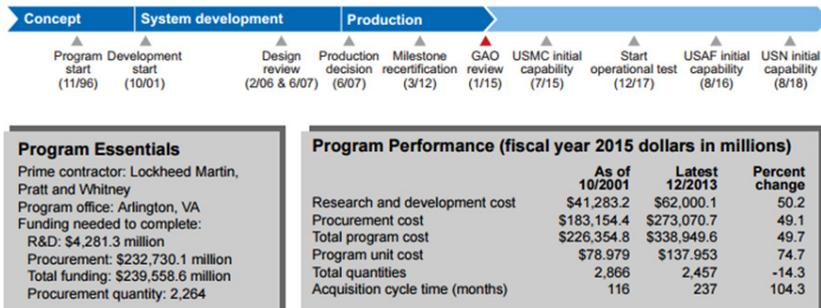


Figure 1. Cost and development of the F-35 programme. <http://nextbigfuture.com/2015/03/us-defense-is-still-getting-less-at.html>

In figure 1, for an example, we have the programme for the F-35 Joint Strike Fighter, one of the most expensive programmes in history, which

⁵ DEVORE, Marc R. *Arms production in the Global Village: Options for Adapting to Defence-Industrial Globalization*. 3. Londres: Security Studies, 2013, Vol. 22, pp. 532-572. 10.1080/09636412.2013.816118.

has already suffered numerous delays, problems and over-run costs. The programme was originally conceived in the 1990s and has taken more than 15 years of development and production. It is something that is repeated time and again in the development and production of modern arms systems.

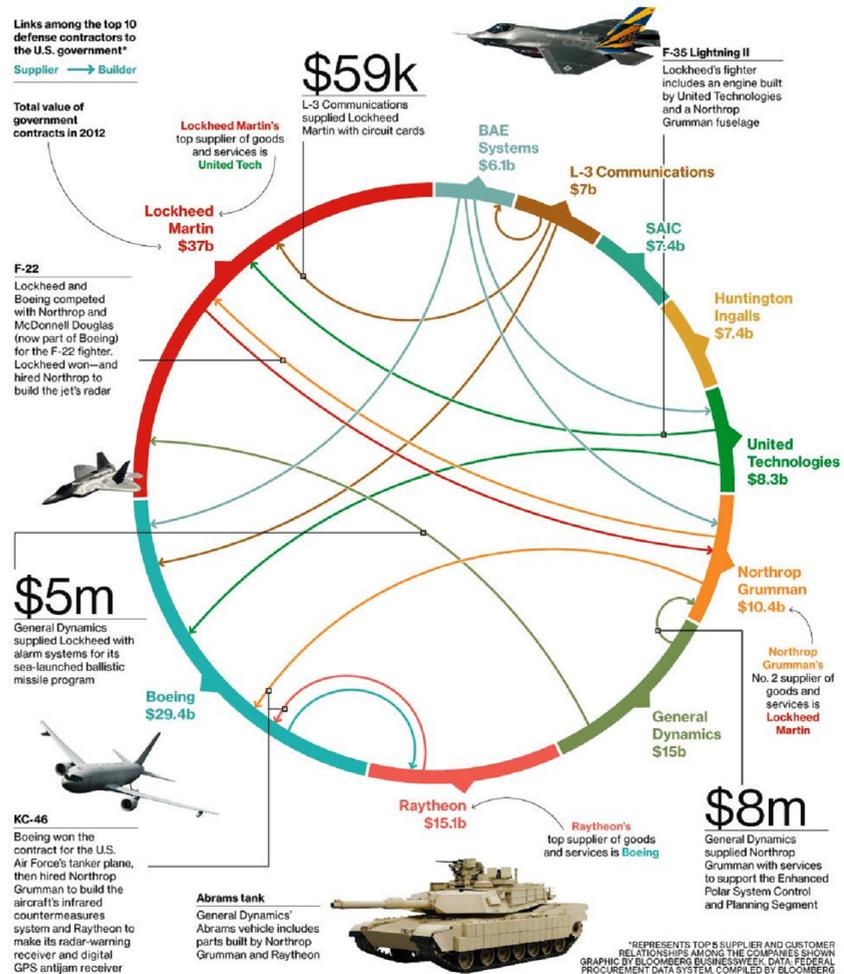


Figure 2. Relationship between arms programmes and the major manufacturers.
<http://theygrayarea.org/?p=45369>

The great inter-relationship among the major arms manufacturers can also be seen in figure 2. Modern arms systems are made up of numerous parts which are not sub-contracted to other companies in the sector.

In short, globalization has brought an internationalization of the arms markets in a way that makes it increasingly difficult, even for bigger countries, to have full autonomy over a product.

According to Devore, medium size states like Spain can use two different strategies to maintain their military industrial base. On one hand they can promote foreign investment in their armaments companies and, on the other, liberalize export and import procedures, or have a balanced combination of both.

Given that countries like Spain are signatories of the main treaties against the proliferation of the arms trade and are also subject to European legislation in this field, it is clear that the liberalization of import and export procedures described by Devore is restricted and limited by the extensive regulations in this field. Also, the solution he proposes does not provide the strategic autonomy or military flexibility necessary that is considered to be the fundamental reason for countries to develop their own independent arms industries. Globalization raises the problem of deciding what industrial and technological capabilities a country should maintain and which can be shared within the framework of alliances and international accords. It is clear that in the case of Spain its membership of the European Union and NATO provides benefits and opportunities in this field, the fruits of collaboration, as is the case with the A-400M programme.

Other procedures put forward by various people to survive in this globalized environment run from competing in niche markets, where the economy of scale is not so important, to shaping their companies to participate in the international supply chains that provide the sub-systems and components for the leading companies in the sector.

In either case, what appears to be undeniable is that globalization has limited the traditional strategic options for a country counting on having its own, self-sufficient arms industry, which in turn is capable of providing the necessary military capabilities.

Another important process that has been adopted by defence industry companies to survive the challenges brought about by the end of the Cold War and globalization has been to concentrate in large business groups. The USA has been exemplary in taking this path.

As can be seen in Figure 3, the process of concentration in the defence industry has been one of the main strategies followed to maintain America's industrial base and to be competitive in the world market, in which they are the leaders. In Europe, the process has been slower and plagued with problems. Quite normal when we consider that France, the United Kingdom, Italy, Germany and also Spain each have an important defence industrial base, which means national interests take priority over collective ones in many instances.

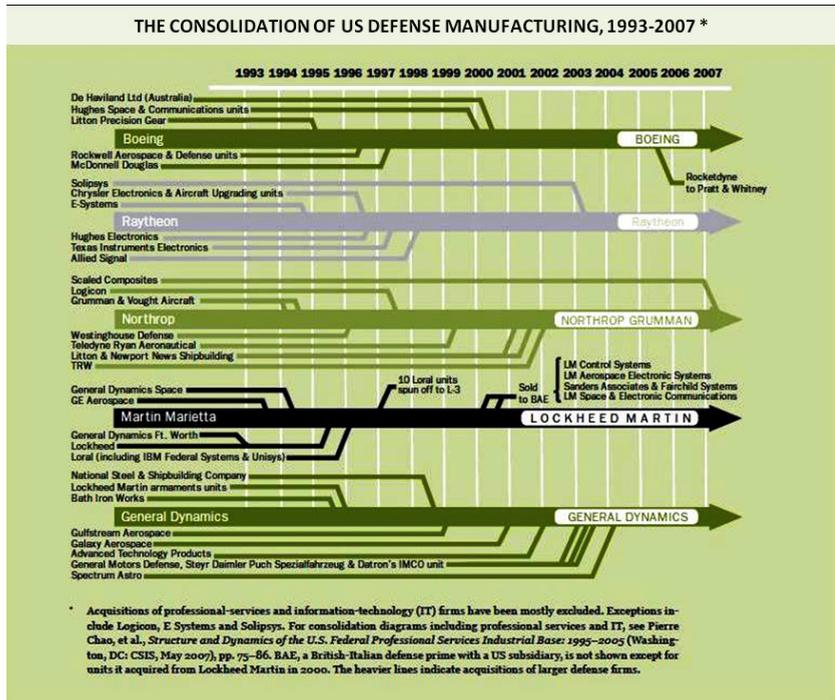


Figure 3. Consolidation of the major companies in the defence industry. <https://timemilitary.files.wordpress.com/2011/09/2011-09-20-defense-industrial-base1.pdf>

It is this fragmentation of the European defence industry that is one of the main factors in reducing its competitiveness.

The convergence of security and defence

Among the most noticeable phenomena in the last two decades has been the growing convergence between the concepts of security and defence. Security has traditionally been associated with the domestic threats to a state and defence with the external ones. This categorizing is falling out of use as it clashes with reality. The Armed Forces of countries are increasingly taking on policing duties, in supporting civil authorities or in humanitarian tasks, not only overseas but also within their own states. Also, military personnel are being used more frequently to take on non traditional risks and threats to security, ranging from organized crime to immigration and natural catastrophes. An extreme case is the creation of military units such as Spain's UME whose members, functions and training are centred on tasks of civilian protection. Naturally, this also has implications for the defence industry. If traditionally there was a nat-

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ural division between companies that catered for the security forces of the state – civil protection etc., - and those that served and equipped the armed forces, that separation is no longer so clear.

Also, the security of countries is no longer a solely national responsibility. Firstly, because of there being a system of collective security the responsibility of the Security Council of the United Nations, and secondly through belonging to international organizations and alliances such as the European Union and NATO with their components of collective defence and cooperative security. Lastly, because of the internationalization and globalization of risks and threats that make it very difficult for a country to face up to security problems unilaterally.

At the same time, as we will see later, there are many non military risks and threats that are seen as priorities and of bigger impact than traditional armed conflicts between countries.

This convergence could have negative connotations for defence, which is based on the positive identification of a threat, and also for security, which requires another type of response that is different to the military one and yet is often treated in the same way.



Figure 4. Security or Defence?

Figure 4 demonstrates this difficulty and the advantages in keeping the concepts and responses separate, as well as the method to be used.

Risks and threats to security and their influence on the defence industry

The Strategy for National Security of 2013 only mentions the defence industry once. It is one of the action points, linked to the objectives of National Defence. The line talks about strengthening «the Spanish defence industrial fabric through promotion, projection and collaboration with national capabilities that, backing up their own operational needs, are considered necessary. Links will be fortified between the main actors in this area (industry, universities and defence)». The word 'industry' appears only once more in the whole document, in reference to cyber-security, in objective 3 of the strategy.

«National Security is defined in an integral and broad form. It is seen as the action of the State aimed at protecting the freedom and welfare of its citizens, to guarantee the defence of Spain and its constitutional principles and values, as well as contributing with our partners and allies to international security to comply with commitments. (National Security Strategy (NSS) (2013))».

The international scene has phenomena that increase our vulnerability



Figure 5. Risks, threats and enhancers in the NSS of 2013

This definition of security is in a way a model one and directs the concept of the risks, threats and risk enhancers defined in the National Defence Strategy of 2013.

From the figure above it can be seen that the main needs for defence are to face up to armed conflicts, which should be taken into account when it comes to defining a possible defence industry strategy. Although, as has been said earlier, security and defence have converged, it can be deduced that other risks and threats such as cyber threats, terrorism, organized crime and emergencies and catastrophes should also be taken into account when it comes to developing an industrial strategy for defence.

However, it is the capability to face up to possible enemies in an armed conflict that continues to define the military capabilities that a country needs. Spain, as a member of NATO, benefits from a collective defence system that has demonstrated its validity and solidity, not only during the Cold War but also afterwards, in operations in the Balkans and Afghanistan⁶. This double, expeditionary and collective defence aspect in turn marks out the capabilities and effort to be developed. Most of the countries in NATO have to a greater or lesser degree adapted themselves to both missions.

However, the crux of the matter as to what should be established in an industrial strategy for defence⁷ is the means, the national industrial capabilities that have to be maintained at all cost to assure non-shared national interests and vital national interests. This is the part that is not assured by the collective form of defence provided by the Alliance.

To determine the main strengths of the industrial base – those that should be maintained – is a basic requisite of any defence industrial strategy. Even more so when the risks and threats are multiplying at the same time as defence budgets are diminishing. Those areas are the ones that by definition provide a vital competitive advantage in military terms. For example, Watts proposes the following areas of competencies and capabilities for the USA⁸:

- Nuclear capability.
- Non nuclear precision attacks.
- Access to global commons including cyberspace.
- The capacity to project forces to develop integrated inter-arm campaigns. That's to say, superiority at operational level.
- Cryptology superiority.
- Real time training.

Naturally, this proposal of the vital capabilities to be maintained is solely valid for the USA, which has global interests and responsibilities and is therefore capable of deploying and acting in any part of the world.

⁶ What is not so clear is that along with the advantages of belonging to the Alliance, public opinion should be clear about the obligations that are acquired with this and the economic effort that this implies.

⁷ And a strategy of national security.

⁸ WATTS, Barry. Centre for Strategic and Budgetary Assessment[in línea] 18 September 2013. [Cited: 13 May 2015.] <http://csbaonline.org/publications/2013/09/sustaining-the-u-s-defence-industrial-base-as-a-strategic-asset/>.

For our Supreme Chief of Staff (JEMAD), the strategic capability priorities for 2014-2015 are the following:⁹

- Maximum qualified personnel.
- Command and control capability and networking.
- Capability for managing targeting.
- Air defence, with anti-missile defence integrated in the structure.
- Mobility and superiority in confrontations.
- Vigilance and reconnaissance (ISR).
- Cyberspace capability.
- Capability for strategic projection and logistic coordination together.
- Supporting the state's actions.
- Inter-operability, both at national level and with partners and allies.
- Reducing the need for energy consumption in operations.

As can be seen the vital capabilities proposed in both documents appear to be similar, in spite of the wide gap in national interests and budget between the USA and Spain, without mentioning industrial capability. Although the concept expressed in each document is different, both could serve as a basis in defining the key capabilities to be maintained.

In either case the definition of risks and threats is a dynamic and changing factor. While it is fairly simple to determine what are the most important risks and threats at a given moment¹⁰, medium and short term predictions are difficult. An example of this is the development of the B-2 Spirit bomber, a programme that began under the Carter Administration. It was an aircraft designed initially to carry nuclear weapons, a strategic bomber, part of the American nuclear triad, and thus a product of the nuclear strategy of the Cold War. A programme renowned for its cost over-run, it was maintained at a reduced level to avoid the losses that cancellation would have meant for companies and the industrial fabric. It has been used in all the recent theatres of war, from Kosovo in 1999 to Libya in 2011, dropping conventional precision bombs such as the JDAM¹¹ during tactical interdiction missions and even for CAS. One has to appreciate the versatility of the design, which has enabled it participate in missions that it was not conceived for, while at the same time evaluating the extravagance involved in using an aircraft with a unit cost of \$2.13 billion¹² for missions that could be carried out by an F-16 or an A-10.

⁹ MINISTRY OF DEFENCE-TEDAE. INFODEFENSA. [in line] 3 December 2013. [Cited: 23 April 2015.] <http://www.infodefensa.com/es/2013/12/11/libro-industria-espanola-defensa-estrategia-futuro.html>.

¹⁰ Although it is not easy to reach agreement in institutions such as NATO and the European Union.

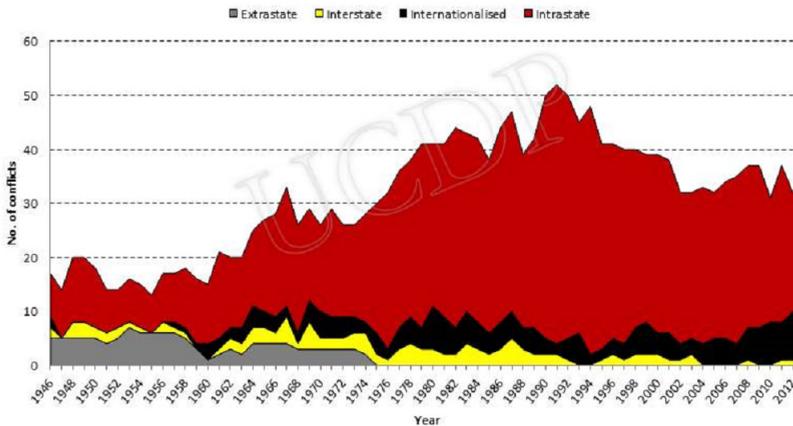
¹¹ Joint Direct Attack Munition.

¹² <https://fas.org/man/gao/nsiad97181.htm>

Current armed conflicts and their implications on defence

The geopolitical tensions that derived from the changes from a bipolar world to a unipolar one, with the USA as the sole super power, and the current moves towards a multipolar one, have generated crises and conflicts that cover the whole spectrum of conflicts and have put in doubt the capabilities of political and military institutions to adjust. Intervention at humanitarian level in the 1990s was followed by the military campaigns in Iraq and Afghanistan as part of the GWOT. At the moment, at the end of the costly campaigns in Iraq and Afghanistan¹³, the panorama of conflict is focused on various areas such as Ukraine, the «Arab revolutions», the resurgence of Salafist jihadism and especially the threat that the so-called Islamic State represents for the Middle East. Of all the current armed conflicts, only the Ukraine one is of an international nature, facing off Ukraine against separatists supported by Russia.

Armed Conflict by Type, 1946-2013



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Figure 6. Typology of conflicts 1946-2013.
http://www.pcr.uu.se/digitalAssets/66/66314_1armed-conflict-by-type-jpg.jpg

This is one of the principal characteristics of armed conflicts. The progressive reduction in conflicts between states and the increase in domestic conflicts, even though they may have an effect internationally. This has led to a proliferation in literature of the so-called «new wars» and the paradigms associated with them. The latest and most popular is the «hybrid conflict», the successor to but sharing – to a greater or lesser degree – the popularity of other predecessors such as asymmetric conflicts, fourth generation con-

¹³ At least that is the official position.

flicts, wars among the population, insurgencies, revolutionary wars, guerrillas, etc. The problem with this proliferation of models is very simple. In selecting one of the models as a paradigm on which to base the threat model, the military doctrine adopted and acquisitions could be wrong. The proliferation of popular concepts of varying truthfulness and accuracy are not making it easy for Chiefs of Staff to specify their present and future needs.

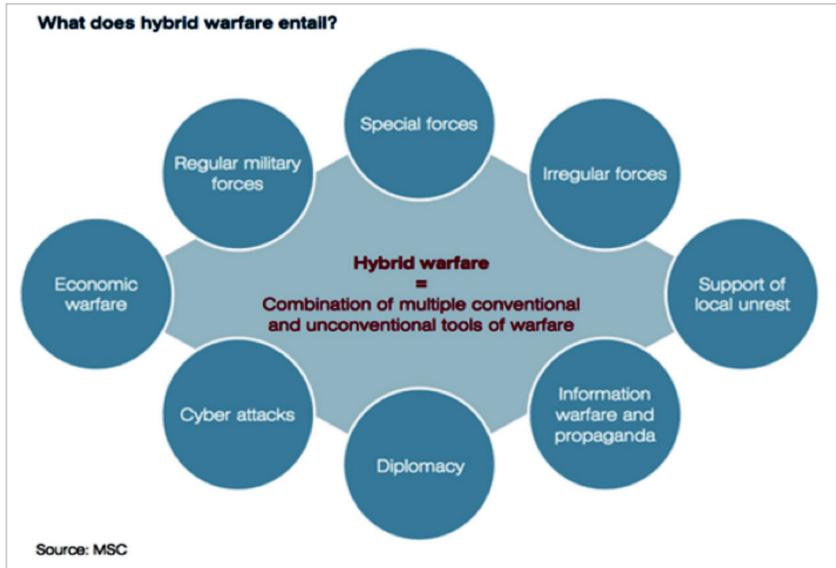


Figure 7. Hybrid warfare. [https://www.securityconference.de/en/activities/munich- securityJoint Direct Attack Munition-report/](https://www.securityconference.de/en/activities/munich-securityJoint%20Direct%20Attack%20Munition-report/)

This presents the problem of how to face up to future threats at the same time as trying to resolve current conflicts. The tension can be seen in the Administration of President Obama, with his attempt to move the centre of gravity towards the Pacific, one that clashes with the persistence of problems and conflicts in the Mediterranean basin and the east of Europe. The military capabilities needed to contain Chinese expansionism in south east Asia are not the same as those that derive from a prolonged campaign against the Islamic State in Iraq and Syria or a 'light' post Soviet version of the Cold War¹⁴. These tensions can also be seen in Europe and in NATO, where geography defines a different perception of threats. Italy, Greece and Spain do not look at the crisis in the Ukraine in the same way that Poland or Lithuania do.

Added to this panorama and typology of conflict are the risks, often forgotten, of the so-called second nuclear era and the resurgence of nuclear

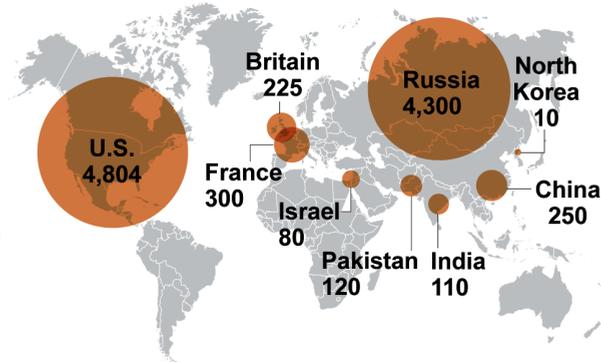
¹⁴ Although many capabilities can be used efficiently for missions different to those they were designed for.

A geo-strategic view of defence

arms, especially in certain regions of the world that are already volatile. The indisputable fact is that there are still some 16,000 nuclear warheads in military arsenals¹⁵.

Nuclear arsenals

The United States and Russia still maintain the largest nuclear stockpiles but seven other nations have arsenals of varying sizes.



Sources: U.S. Department of Energy, Federation of American Scientists

Javier Zarracina / @latimesgraphics

Figure 8. Nuclear arms in the world. <http://www.latimes.com/nation/la-na-g-nuclear-arsenals-20141110-htmistory.html>

Along with the paradigms on the transformation of the nature of warfare are the concepts related to military revolutions. All these concepts, those that announce change in the nature of war and those that offer to eliminate «the fog of war» and friction have a point in common, thanks to technology: the attempt to dethrone Clausewitz as the maestro of western strategy and therefore his Trinitarian model for war.

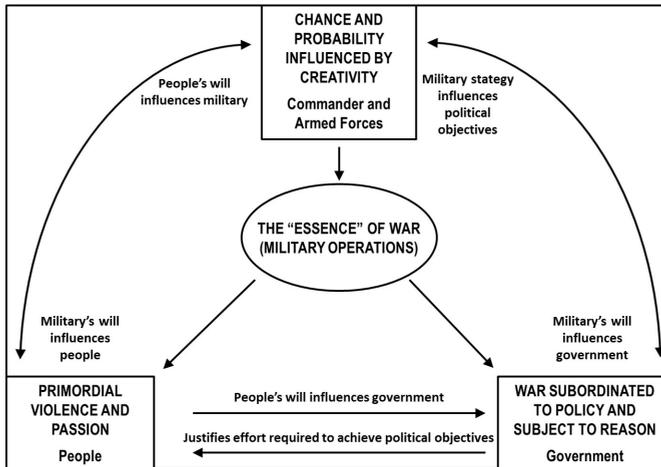


Figure 9. A representative graphic of the trinity of Clausewitz. <http://www.airpower.maxwell.af.mil/airchronicles/apj/apj98/spr98/edmonds.html>

¹⁵ Source FAS.ORG <https://fas.org/issues/nuclear-weapons/status-world-nuclear-forces/>.

In the second category there are the revolutions in military issues, transformations and the latest offset strategy, Network Centric Warfare, Effect Based Operations, Shock and Awe, etc. The aim of these lines is not to digress into their validity or utility but to note that these debates can affect the selection of capabilities and therefore the defence industry. In short, the strategy should avoid passing fashions and focus on what is important.

What arms are sold?

In any text book on security, trade in arms is always treated as a challenge, especially where it refers to small and light arms and also dual use technologies, which are linked in particular with the proliferation of Arms of Mass Destruction. Trade in arms is closely linked with all that is related to peace and international security. It is also regarded as a prime polemologic factor.

There are three elements to the global arms trade (4): the sale of systems such as ships, tanks and aircraft; of light and small arms, and lastly dual use military and civilian technology.

The first channel: the sale of complex and advanced systems between states has important geopolitical and geo-economic consequences. For example, the possible sale of Russian S-300 anti-aircraft systems to Iran has important geopolitical implications when it coincides with negotiations over the Iranian nuclear programme. Clearly, geo-economic reasons are also key in the process. Countries seek to balance their payments by selling advanced arms to countries that export raw materials. Military support to allied and friendly countries is usually accompanied by the aid money being used to buy advanced arms systems from the state in question. It is a sort of diplomacy through arms sales. Major arms systems affect the balance of power in different regions of the world and can lead to arms races. Figure 13 shows how Saudi Arabia has the third biggest defence budget in the world after the USA and China. Geopolitically speaking, it could indicate that their alliance with the USA is not as strong as it used to be, and/or that the country is arming itself to counteract the growing influence of Iran in the Middle East. The defence budget is also a necessary precursor for its military intervention in Yemen. The suppliers of advanced arms systems continue to be the same as those during the Cold War: the USA, Europe and Russia, which in a way are following the same dynamic of power and geopolitical influence in those regions of the world where their interests lie. Some rules are broken in this geopolitical game. Technology is also transferred, allowing other players to take part in the game. China is also becoming an exporter of developed arms thanks to the «loan» of Russian military technology and western dual use technology.

A geo-strategic view of defence

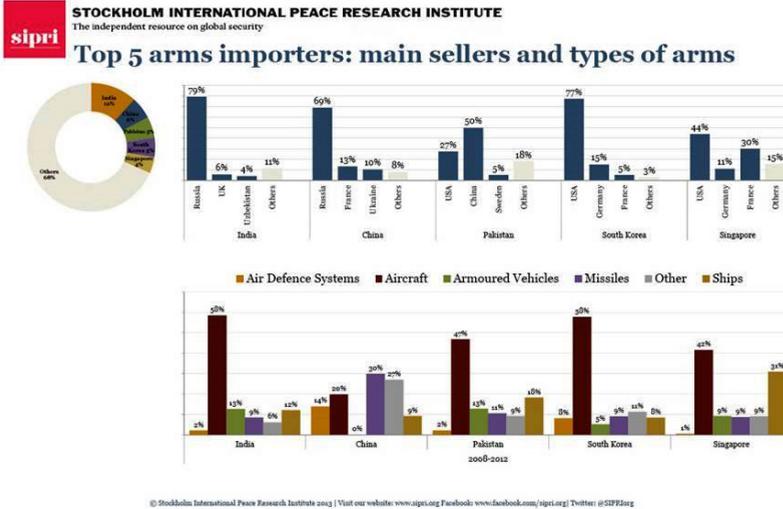


Figure 10. The five biggest importers of arms and who sells them. Source Sipri 2013.

As can be seen in figure 10, the five biggest arms importers in 2013 were India, China, Pakistan, South Korea and Singapore. The leading exporter of arms to China and India was Russia, while South Korea and Singapore were supplied primarily by the USA. Pakistan imported arms from both the USA and China.

The second channel of the arms trade is for small and light weapons. The geopolitical impact of this sector is as big as that for the main arms systems, although of another type. The proliferation of light arms has a disproportionate impact in non international conflicts and their trafficking represents one of the biggest problems for world security. This subject has been widely covered in Strategy Notes 169, Disarmament and control of armaments in the 21st century.

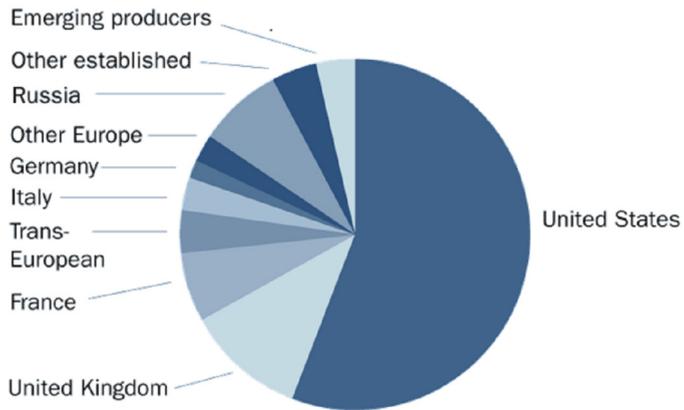
The third channel involves the sale of dual use technology, for both civilian and military use, which is a common way for some countries to get around sanctions and legal limitations on exports. The Independent newspaper accused the United Kingdom in 2013 of selling military equipment and technology to countries with dubious humanitarian records.

Whatever the truth is behind the report, western governments and companies are faced daily with this type of decision, ones that affect geopolitical and economic interests and that in some cases produce doubts over the ethics involved, although not normally the legality. This type of restriction does not often have affect in other countries, such as China or Russia, whose exports are not restricted by the same legal and ethical parameters.



Figure 11. Value of the UK arms exports. Source “The Independent” (Segupta 2013).

Share of arms sales of companies in the SIPRI Top 100 for 2013, by country



www.sipri.org

Figure 12. Percentage of arms sales for 2013. (Stockholm International Peace Research Institute (SIPRI) 2014). (The International Relations and Security network 2013).

Who sells the arms?

According to SIPRI, the main arms sellers are the USA, Europe (Germany and France), China and Russia, as can be seen in figure 12. International sales of large scale arms systems for the period 2010-2014 were 16% higher than in the previous period (2005-2009).

The five main arms exporting countries accounted for almost 74% of all exports. The most notable change in the rankings is that China has overtaken Germany in recent years to take third place among the principal arms exporters. The USA and Russia maintain first and second positions respectively. Spain stayed in seventh place, more or less at the same level as Italy. For Russia, most of its exports – nearly 60% - go to India, China and Algeria. Of China's exports, almost 68% go to three countries, Pakistan, Bangladesh and Burma. China also exports weapons to 18 African countries.

According to the military balance of 2015, which can be seen in figure 13, the defence budget of the USA is almost as big as those of the other 15 countries at the top of the list put together. It is relevant to note that China occupies second place, still well behind the USA for the moment, and the disproportionate defence spend of Saudi Arabia, which reflects the big regional tensions, both with Iran and the self-styled «Islamic State». Japan's seventh place and South Korea's tenth position are also a reflection of the geopolitical tensions in that part of

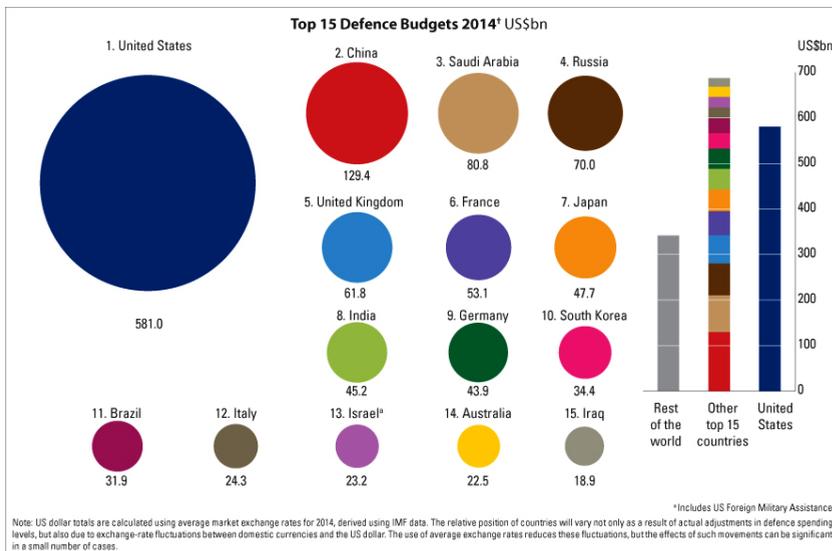


Figure 13. Top 15 Defence Budgets for 2014. <http://www.tandfonline.com/action/showCitFormats?doi=10.1080/04597222.2015.996338>

Asia. Clearly China's assertiveness in foreign policy is seen as a threat by other countries in the region.

The economic crisis which has hit Europe so hard has had a critical effect on European defence spending. Figure 14 shows this. While in other areas of the world defence spending has grown, in Europe it has shown a noticeable decline. Exceptions are the north and south east of Europe, regions where the spend has increased by nearly 5%.

The key question is whether with the current geopolitical framework, with risks and threats on the up and the proliferation of nearby conflicts, this reduction is justified or is simply a reaction to the economic crisis. The concept of security itself, which covers much more than military de-

Europe: Real Defence Spending Changes 2010–14 by Sub-Region (%)

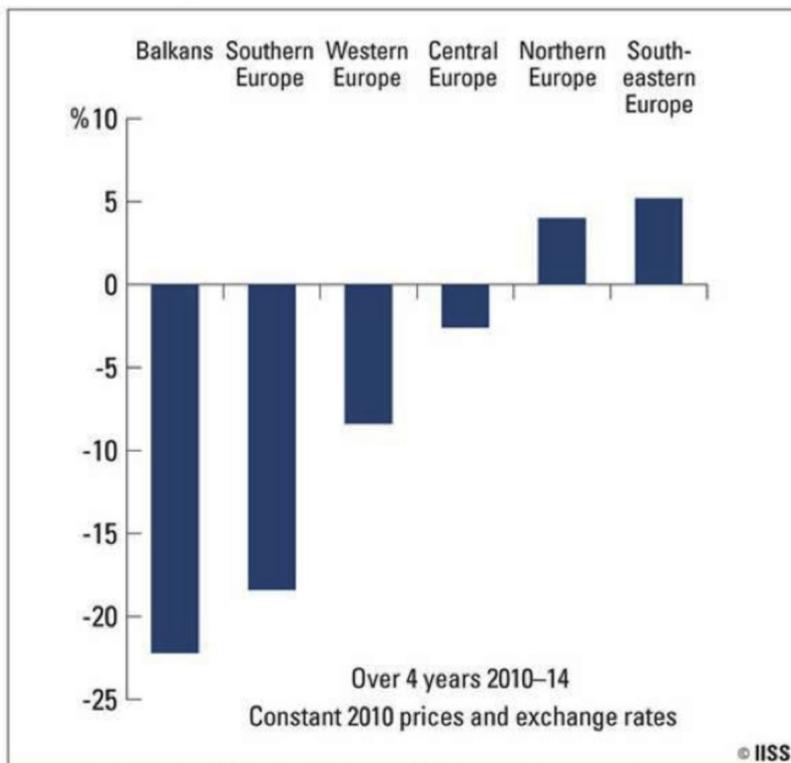


Figure 14. Changes in defence spending 2010–2014. <http://www.tandfonline.com/action/showCitFormats?doi=10.1080/04597222.2015.996338>

fence and the fact that to have this security Europeans focus more on the means than on the goals, makes the answer appear obvious. Security is no longer sought exclusively through military means but also through an integral response to risks and threats.

Moreover, belonging to collective defence organizations like NATO, or the collective security system of the United Nations, means that awareness of defence in Europe is not very high, because the perception of security is shared. Europe has become accustomed to living under the defensive umbrella provided by the United States and finds it hard to assume its responsibilities in security matters.

The change in the geostrategic centre of gravity towards the Pacific announced by President Obama can also be seen as a warning to Europe to take on the responsibilities that correspond to it in international issues. Clearly, Europe has become accustomed to the USA providing a defensive umbrella via NATO.

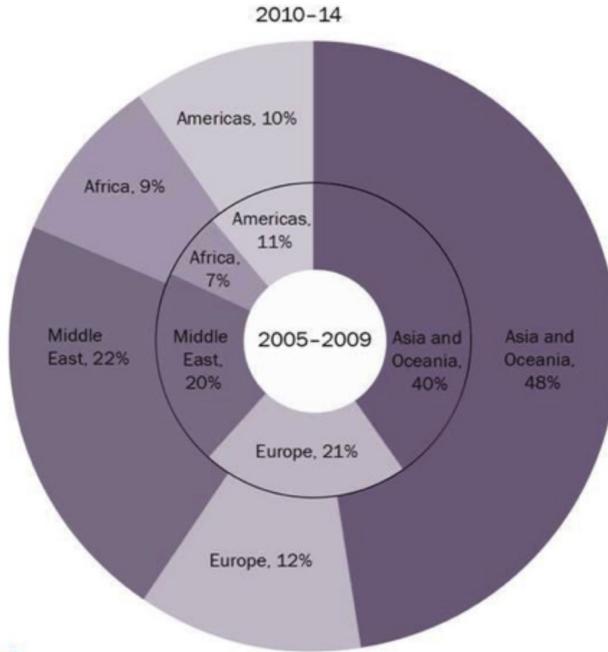
The case of Spain, with a reduction of more than 20% in defence spending between 2012 and 2013, is counter to the increased spending of eastern European countries such as Poland and Rumania. These differences reflect the geopolitical tensions perceived in the east, because of the supposed threat. In Spain, however, it seems that the arc of conflict which extends from the Near East through the Maghreb countries is not seen as sufficient to increase defence spending.

Who buys the arms?

According to SIPRI, the biggest importers of arms are in the Middle East and South East Asia. To be precise, the principal importers in the period 2010-2014 were India, Saudi Arabia, China, the UAE and Pakistan, which accounted for 33% of the total. In the previous period, from 2005 to 2009, the three main importers were also India, China and the UAE. In Africa there was an increase of 45% in imports between the periods of 2005-2009 and 2010-2014. The three main importers there were Algeria, Morocco and Sudan. It is clear that the growth in arms imports to Algeria and Morocco can be connected with the continual rivalry between these two countries. But it also demonstrates the internal tensions provoked by the «Arab revolutions» and the rise in radical Islamism.

Figure 15 shows the changes in the importance of arms imports and the weighting towards Asia and the Middle East. Also to be highlighted is that Europe has dropped from 21% to 12% of total imports. This clear fall is linked with the economic crisis, while the increase in sales in Asia and the Middle East demonstrates the arms race going on in these regions, as well as the underlying tensions and conflicts.

The importers of major weapons, by region, 2005–2009 and 2010–14, per cent of global share



www.sipri.org

Figure 15. Leading importers of arms. Source SIPRI.

India is quite obviously re-arming. Its arms imports increased by 140% from the period 2005–2009 to 2010–2014. It has surpassed China in the quantity of imports and is clearly ahead of its regional rival, Pakistan. China, however, has reduced the pace of its imports, now occupying only third place, mainly because of growing independence through national production.

Among the conclusions to be taken from all this data is that while Europe and the USA are cutting their defence budgets and their acquisition of advanced arms systems, the rest of the world – especially Asia and the Middle East but also Africa – are increasing theirs. That is to say Europe and the USA are losing economic, political and military weight, slowly but surely.

Why do they sell arms?

To make a profit could well be the first intuitive answer to this question. However, although it is one of the basic reasons, as can be seen from

these lines it is not always the main reason for the states involved. Clearly, the competitive arms market is one of the economic strategies for the viability of national industry. Also, for powers such as the USA, France and Russia it has been and still is a way of achieving geo-strategic objectives.

A country selling complex arms systems such as aircraft, ships, command and control systems etc., can gain a more or less permanent influence over client governments. That influence can be seen in various ways. Technology transfer, dependence on maintenance by the seller, employment doctrines, specialization courses, relations between armed forces and chiefs of staff etc. However, the type of influence associated with military aid or the sale of arms is limited by conditions and is not automatically guaranteed. An example of this is the relationship between the USA and Pakistan. The USA has been economically aiding Pakistan since 1948¹⁶. The reasons have been of a geostrategic nature and the aid has fluctuated in accordance with strategic reasons. During the Cold War Pakistan was a desirable geopolitical ally for the USA's strategy of contention of communism. The Soviet Union's intervention in Afghanistan (1979-1989) only increased the common interests between both countries. Serious disagreements caused, for example, by the development of nuclear weapons by Pakistan and the discovery of the Abdul Qadir Khan network that sold nuclear secrets to North Korea and Iraq marked the lowest moments in the flow of US aid, although it has never stopped. The start of the «war on terror» (GWOT) signalled an increase in both military and economic aid for development. Yet despite all the money invested by the USA, Pakistan has always been an uncomfortable and at many times a disloyal ally. It is a country whose cohesion and national unity are based on Islam to keep it together and therefore has a contradictory view of Islamic fundamentalism. On one hand it supports regional terrorism against India, serving as a sanctuary for the Taliban and other terrorist groups confronting NATO and the USA in Afghanistan. On the other, it fights against these same terrorist groups when they prejudice its interests. The case of Osama bin Laden, who hid away in Abbottabad, is a case in point.

Russia is also significant as an example of the reasons why exporting arms is a matter of national security. For Russia the sale of arms is aimed at a series of important geo-political and strategic goals (6)¹⁷:

- Improving its image as a great world power.
- Maintaining an independent foreign policy.

¹⁶ SEGUPTA, Kim. *The Independent*. [Online] July 17, 2013 [Cited the: May 1, 2015]. <http://www.independent.co.uk/news/uk/politics/blood-money-uks-123bn-arms-sales-to-repressive-states-8711794.html>.

¹⁷ *Geostrategic aims of the Russian arms trade in East Asia and the Middle East*. BLANK, Stephen y LEVITZKY, Edward. 2015, *Defence Studies*, pp. 1-18.

- Expanding Russia's influence in certain regions.
- Obtaining rights on extraction and strategic resources.
- Initiating or reinforcing defence relations.
- Obtaining rights for the use of military bases in other countries.

Along with the more common reasons of keeping their defence industrial base going and making profits.

According to the author quoted, this geo-economic and geo-political game manifests itself in ways that can appear unusual, as is the example with China. China is a major market for Russia and also a competitor and more than likely geopolitical rival in the region. That is why selling advanced military technology to a country with which one might have a conflict in the future could be seen as contrary to Russia's strategic interests. However, there are also good reasons for doing it. For example, ensuring a market quota in a key region and having a clear idea of what are the capabilities and weaknesses of the main arms systems of a possible strategic rival.

Russia also sells arms to India, and traditionally of better quality and more advanced than those exported to China. Therefore, selling arms to two possible geopolitical rivals, as are China and India, can maintain or accelerate the arms race in the region and the same time maintain or not the balance of power. It is a delicate game in which the main beneficiary is Russia. Being economically and demographically much weaker than China or India it can use the sale of arms to modify the geostrategic situation to its benefit.

The important thing is to understand that weapons play a relevant role in part geostrategic that manifests itself in many ways, although they never reach to be used in armed conflicts. Flows of weapons, their quantity and quality, the modernity of the same, etc., are signs that reflect major geopolitical realities.

The contemporary geo-political framework

The fall of the Berlin Wall and the dismemberment of the Soviet Union, the «Arab revolutions» and the armed conflict in Ukraine are historic landmarks with geopolitical consequences that have something in common. They were not foreseen by the numerous analysts, specialists in the subject, or intelligence services, or by governments with regional or global interests.

During the Cold War the geo-political framework was more or less well defined. It was a bi-polar world that saw countries face up by proxy in South East Asia, Africa and the Near East and respected the respective spheres of influence. This stable geopolitical framework tried to maintain itself

through diverse strategies such as «contention», or «the domino effect theory» in South East Asia. These strategies were influenced by the geo-political views of geographers, historians and politicians like Mackinder, Spykman, Kennan and Kissinger. As mentioned earlier, the threat of nuclear arms, the Soviet conventional superiority, and the arms race characterized the confrontation. Nuclear arms contributed to the development of the race for space and military industry. The same technologies used to put a lunar module into space also served to launch ballistic intercontinental missiles.

The current geo-political framework is not so clear. This lack of definition means that the development of national security strategies is moving towards generic risks and threats, as has been shown earlier. And that with this lack of definition military capabilities are also becoming generic, or in theory capable of being used in various scenarios against different threats. Many of these risks and threats cannot be managed through the use of force. Yet they may need an initial response from the military, often the only ones prepared and with sufficient means to reach the affected area.

The end of the Cold War brought with it new ways of seeing the world, which can be identified with the geo-political thinking of writers like Fukuyama and his End of history, Huntington and his Clash of Civilizations, the Pentagon's New Map by Thomas Barnett, etc. However, these paradigms have been repeatedly criticized and their limits for forecasting and being used as models for generating the major strategies of a unique superpower have been demonstrated.

The geo-political analysis of the most urgent conflicts at present reveals a series of interwoven dynamics that make up a complicated tapestry. If we take as an example the conflict in Syria and Iraq, with the emergency of the self-styled «Islamic State», we can extrapolate at least 10 different geopolitical dynamics that are interacting simultaneously in the region.

The Middle East and North Africa are two linked geopolitical zones, especially in the last few decades, with this process catalyzed by globalization. The cultural and religious unity of the region, as well as its shared history, have always promoted relationships between the inhabitants of the region. Currently, one has to think about a series of important geopolitical dynamics as being the framework for the armed conflicts that extend in an arc of instability that has profound security implications for Europe and Spain.

First there were the Arab revolutions, which started in 2011 and were dubbed «the Arab spring» by the media. These have had very diverse results in the countries affected. Protests which had a democratic origin have in many cases followed the natural path of other historic revolutions. Democratic desires have been drowned in blood in cases such as Syria and Libya, or have returned to the previous status quo as is the case in Egypt. Over all of them glides the shadow of fundamentalism and terrorism.

The implications for regional security from this revolutionary process are linked to terrorism, massive and uncontrolled migrations of people, armed conflicts, economic damage, energy security etc.

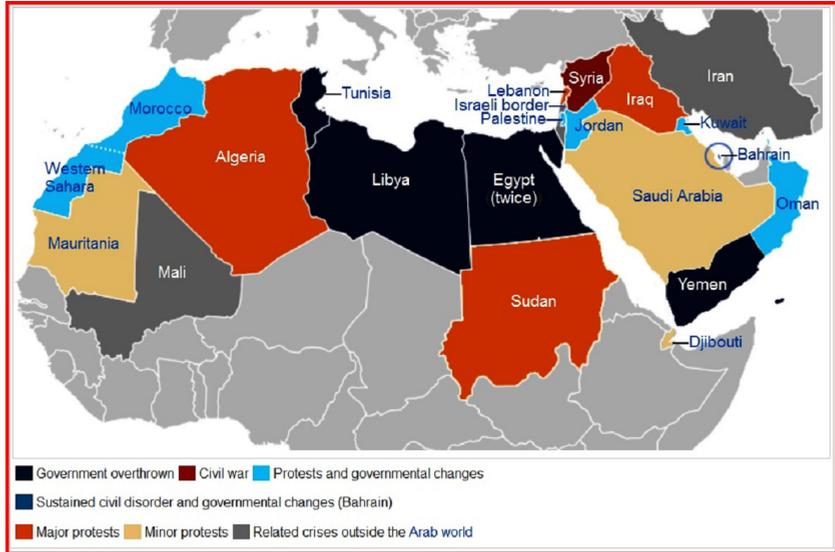


Figure 16. The Arab revolutions. Source: Wikipedia.

Secondly, jihadist and salafist terrorism in the region must be considered as a leading polemological factor and one of the most important geo-political dynamics for its effects on regional and global security.



Figure 17. Salafist and Jihadist terrorism. Source, the Economist.

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The spread of salafist terrorism, far from diminishing, is a phenomenon that is increasing in the region and causing serious problems for regional and global security. Terrorists are intervening in the Arab revolutions with the aim of taking over power as part of their grand strategy for creating a universal caliphate.

Thirdly, there is the confrontation between Iran and Saudi Arabia for regional hegemony. This face-off is taking place on various fronts such as the conflict in Yemen, the arguments over the Iranians' nuclear programme, and at the same time in Syria and Iraq.

Fourthly, there is the grand US strategy for the region and the protection of its security interests.

Among the Americans' geo-political interests are military control of the Near East, the contention of Iran, protection of the state of Israel, negotiations with Iran to avoid nuclear proliferation in the region, ensuring the flow of cheap energy from the Near East region, etc.

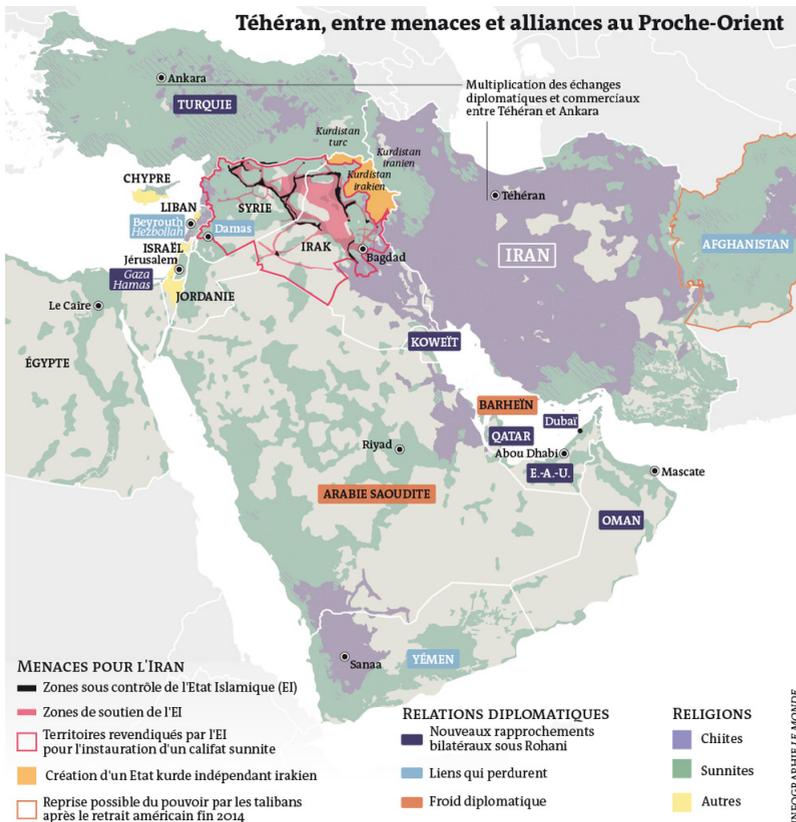


Figure 18. The regional power game in the Near East. Source: Le Monde. http://www.lemonde.fr/idees/infographie/2014/09/12/iran-l-arbitre-du-proche-orient_4486843_3232.html

In fifth place is the continuation of the «war on terror» by the Obama Administration. The most favoured means has been the use of armed drones to kill terrorists, especially in Yemen and Somalia. The continuation of the battle with the drones, has important strategic implications. The effectiveness of their use has to be balanced against the ethical, judicial, political and military problems that the use of this new type of weapon represents and its more than likely proliferation in the near future.

In sixth place there is the never ending conflict between the Palestinians and Israel and its influence on the region. It has been used as a justification for international terrorism and is an important element in all the conflicts in the region. Whatever the nature of the numerous problems in the region, the Palestine v Israel conflict is used as a justification, bargaining chip or explication on all occasions.



Figure 19. Obama's Great Game. Source: Heartland. <http://temi.repubblica.it/limes-heartland/obamas-big-game/1344>

In seventh place there is the conflict between Shiites and Sunnis, which is going on in various parts of the region such as Lebanon, Syria, Yemen and Iraq. This is closely related with the regional hegemony battle between Iran and Saudi Arabia in regional scenarios such as Qatar, Yemen, Iraq, Syria, Libya, etc.

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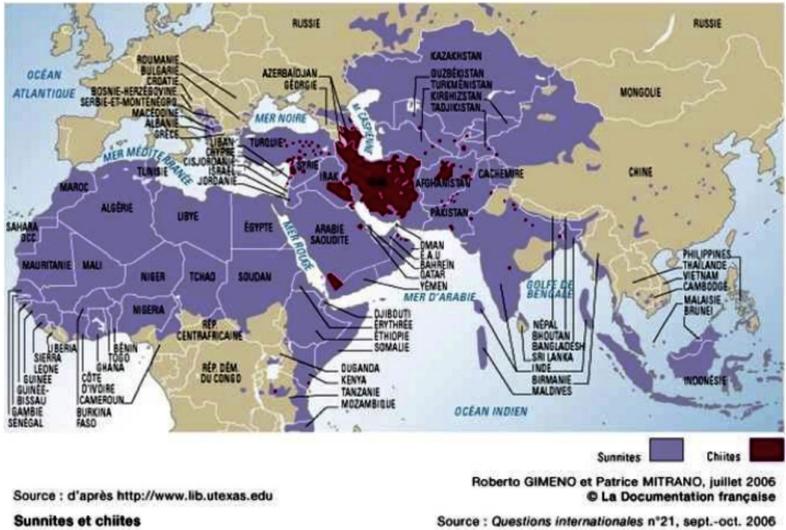


Figure 20. Sunnis and Shiites in the world. Source: *Questions internationales*, n°21, September - October 2006, p. 21.



Figure 21. Spread of the Kurdish problem in the Near East. Source: *Le Monde Diplomatique*. <http://mondediplo.com/maps/kurdistanborders>

In eighth place are the ethnic conflicts, especially the Kurdish problem and its geo-political implications, with the possibility of a Kurdish state emerging

as a consequence of the civil wars in Iraq and Syria. It is a problem that affects all those countries that have Kurdish minorities within their frontiers and represents a major element of friction for Turkey as shown in its management of the battle against the «Islamic State» and the use of its territory as a crossing point by terrorists wanting to join the fight in Syria and Iraq.

In ninth place there is the drift towards Islam of the government in Turkey, a member country of NATO, and the neo-Ottoman stance of President Erdogan. He has recently been showing mistrust towards the West, hostility towards the Kurdish population and has an ambiguous posture as regards the fight against the «Islamic State».

The tenth and final point regards the geo-strategy of Iran in the region, which is trying to maintain an arc of influence from Mesopotamia to Lebanon, based on links with related governments and militias. This strategy is feeding the distrust of governments in the region and its intervention in numerous conflicts. The latest chapter, up to now, of Iran's expansionism in its search for hegemony concerns the threats from Saudi Arabia connected with its intervention in Yemen. Added to this, there are the eternal negotiations over Iran's nuclear programme and the negative implications for the regime of not going nuclear and the regional arms race.

Le jeu des puissances régionales



Figure 22. The Shiite crescent. Source: Courrier International. <http://www.courrierinternational.com/article/2014/02/19/arabie-saoudite-le-royaume-dechu>

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In short, the current conflict falls within an extremely complex geo-political setting, one that is very difficult to cover in a single viewing. The problem this represents for a possible resolution to the conflict is linked with the impossibility of determining coherently the regional implications of any type of possible intervention. The tapestry of relations and interactions in such regions is so tangled that any strategy should be carefully thought through to avoid even bigger ills.

This example of a complex geo-political web in a single region should give an idea of the difficulty in establishing an adequate geo-strategy at a global or regional level, from which can be derived parts of a national security strategy and therefore an appropriate industrial strategy for defence.

Along with these regional dynamics in the Middle East there are other important ones at a global level when it comes to defining the current global geo-political scenario.

In particular, there is the persisting conflict within the boundaries of the former Soviet bloc, materialized at present in the Ukraine and with the possibility of it extending to other regions under the NATO umbrella.

The evolution of a second nuclear era and a regimen of non-nuclear proliferation, linked with negotiations over the Iranians' nuclear programme, North Korea's nuclear challenge, the tensions between India and Pakistan, and the rivalry between China and India, etc.

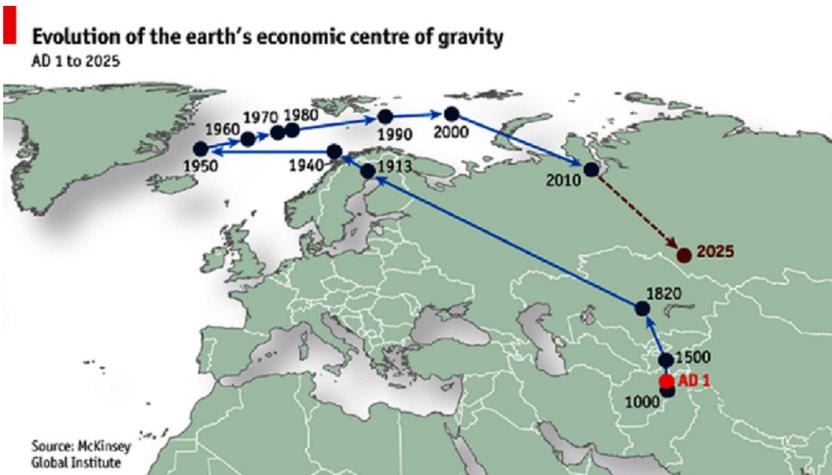


Figure 23. Evolution of the earth's economic centre of gravity. Source: The Economist. <http://www.economist.com/blogs/graphicdetail/2012/06/daily-chart-19>

Without being fresh news, the change in the world's centre of economic gravity towards Asia is surprising for its apparent rapidity. It took nearly

1,000 years to move from Asia to Europe, while the reverse change is taking place in a matter of a few decades.

Greater assertiveness by China in its foreign policy and the conflict in the making for control of the South China Sea.

According to some international relations theories, this change in the world centre of economic gravity, along with one to a multi-polar world and a more aggressive foreign policy from the Chinese are symptoms that portend more regional conflicts, and more serious armed conflicts cannot be ruled out.

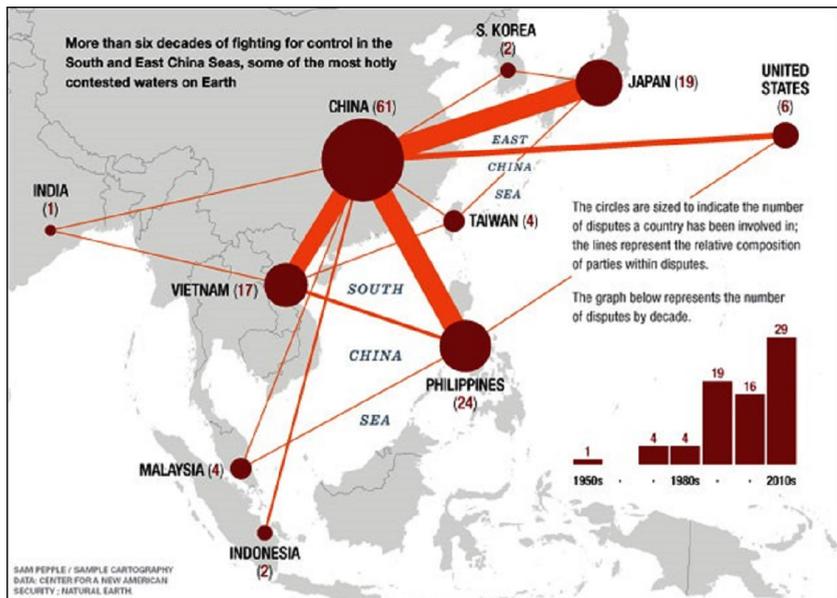


Figure 24. Conflict in the South China Sea. Source: Center for a New American Century <https://www.foreignaffairs.com/map-conflicts-south-and-east-china-seas>

In its report, *Global Trends to 2030: Can the EU meet the challenges ahead*, ESPAS¹⁸, points to five global tendencies, the fifth of which has special implications for security. «Changes in the balance of power, inter-dependence and fragile multilateralism». What this trend signifies is that the world has entered an age of insecurity, more inter-connection and inter-dependence, but also one that is more fragmented, insecure and polarized. The international setting will probably change, with the United States still in a dominant role but challenged by the growth of China and other emerging powers. Multilateralism is weakening. Its commitments will be shared between multilateral organizations, regional al-

¹⁸ European Strategy and Policy Analysis System.

liances and other restricted structures. The convergence of civilization towards shared values such as human rights, democracy and liberalism could come to a halt.

Along with these predictions the document sets out a group of uncertainties that are reflected in an increase in systemic risks brought about by the challenges facing emerging countries in their economic transitions. Globalization could degenerate into more internal divisions within countries and external ones between different states. The future of democracy as a political system is being called into question and its future at a global level is uncertain. New economic and political alliances around emerging powers could lead to the creation of new multilateral structures that rival the current ones. The USA might revert to a more isolationist policy, as it did prior to the First World War.

Moreover, one cannot rule out certain events happening, the so-called «black swans», such as a major conflict, possibly nuclear, with disastrous consequences. The collapse of a pivotal state, somewhere near Europe, that would have serious implications for the region. Also not to be discarded is a new confrontation between great powers, similar to the Cold War.

In the face of these uncertainties, the report states that the European Union cannot maintain the status quo solely on the basis of «soft power» as has happened up to now. That is why it has to put more emphasis on defence in its most conventional context, of armed force that can be projected to ensure regional stability. According to the report the member countries of the European Union account for 31% of the global spend on defence, excluding the USA. However, these figures do not translate into equivalent capabilities. Only five countries have the capabilities to cover a complete conflict spectrum, although by 2030 possibly only the United Kingdom and France will be still capable and at a lower level. That is why in the strategic calculations that are channelled into an industrial strategy for defence, the supra-national organizational organizations which they belong to have to be taken into account. Europe, for example, has some 5,000 main battle tanks and a multitude of third and fourth generation aircraft. That is to say, there is a proliferation of certain capabilities and a big deficit in others that are more modern and necessary.

The relationship between military capabilities and security

Any casual observer of military affairs can remember without much difficulty examples of the impact that military technology has had in war. One of the best known and discussed ones is the use of armoured vehicles – the tank – by both sides during the Second World War. But the relationship

between technology and war has been detailed in history books since the days of antiquity. The Greek Byzantine fire, the artillery that ended feudalism, the muskets used by Spanish troops in Flanders, the Welsh longbow, military aviation, the railway and the telegraph in the wars that brought about the unification of Germany, atomic bombs and a long et-cetera that demonstrates the fascination for military technology and the hope that superior armament, in some way, can make the difference on the battlefield.

For example, when one of the architects of German armoured power, General Guderian, wrote his best-seller *Achtung Panzer* he did not speak about the tank as a strategic weapon but as a tool for returning tactical mobility to the battlefield. This mobility and its capability for breaking through the enemy front in depth could be deployed decisively at operational level. In short, Guderian wanted to make the tank the centrepiece of an inter-arms team (including an air arm) to break down the stalemates that had occurred in the First World War. The key of the Germans' successful use of the tank was not technological but doctrinal. The Germans were not looking for a panacea, but to integrate their technological advances with others, in a theory of coherent war.

They achieved it, but forgot the grand strategy along the way. German politics was led by the Nazis, who based their decisions on anti-semitism, racism and aspects of geo-politics such as living space. What is important is to highlight that one of the main problems behind the over extending of Germany during the Second World War was its excellence at operational level and its total lack of a viable strategy.

The armed forces have a difficult relationship with technology and adapting to the changes that it produces. In an ideal world strategy should be the guideline for defining necessary capabilities and the technology to develop. In reality, technological development, even that derived from military need, is normally well ahead of the capacity of a country and its military to adapt to this change. Moreover, strategy as such is not something that is static and permanent in time. It is a very dynamic art, «the saying of a doing», as General Alonso Baquer would have put it, and therefore in continual movement and a state of imbalance between its three components: aims, ways and means.

The paradigm case of imbalance is, without doubt, the First World War and the development of technologies that were not reflected in the doctrine and organization of the armies that faced each other on the battlefield. European armies went to the slaughterhouse of the Western Front with doctrines in keeping with the Napoleonic era, to new battlefields dominated by artillery, machine guns and repeating rifles. The initial response to the strategic challenge represented by superiority of defence was the

massive use of artillery and the sacrifice of the infantry on the Somme and at Verdún. However, far from letting themselves become dominated by fatalism, the chiefs of staff and the war industries tried to adapt to the challenge. Chemical warfare, military aviation, new artillery techniques, improved command and control, the development of new military doctrines, the submarine war and new tactics such as infiltration were the response.

The post-war period brought an evolution in strategic thinking and the development of solutions noted during the fighting by the likes of Svechin, Mitchel, Guderian, Lidell Hart, Fuller, Triandafillov, Tukhachevsky, etc., which were put into practice during the Second World War, such as the strategic bombing of cities – the blitzkrieg – and the Soviet operational art of deep battle. In the end the war was not decided by the application of operational skills on the battlefield but through the strategic wearing down of the Axis powers by the greater combined industrial superiority of the Soviets, the British and particularly the Americans. The finish of the war was marked by the start of the Nuclear Era with the bombs dropped on Hiroshima and Nagasaki.

More recently, debates come to mind easily about military revolutions, technical military revolutions, the «revolution of military affairs (RMA)» and the so-called Transformation, promoted by US Defence Secretary Donald Rumsfeld before and after the Gulf War of 2003. Naturally, the defence industry always tends to promote its technology with the more or less veiled promise of an easy victory, or at least having superiority over the enemy.

The revolutions of military affairs are aimed at eliminating the uncertainty in a confrontation through superior technology, more or less dressed up in notions of doctrine and with shades of strategic thinking. This goes against the strategic paradigm of the trinity of Clausewitz and the intrinsic characteristics of the nature of war, such as «friction», fate, uncertainty, primordial violence, passions, and the roles of military genius and the fog of war which have been accentuated by the so-called revolution of information and the use of cyberspace in all its fields.

As has been seen, in Europe there is a tradition of talking about a western way of making war based on superiority provided by technology, discipline, strategic thinking and professional armed forces. This theory appears to demonstrate that small professional armies with technological superiority are capable of defeating the whole panoply of conventional and irregular enemies that may have to be faced, what is currently graphically illustrated by the so-called spectrum of conflict.

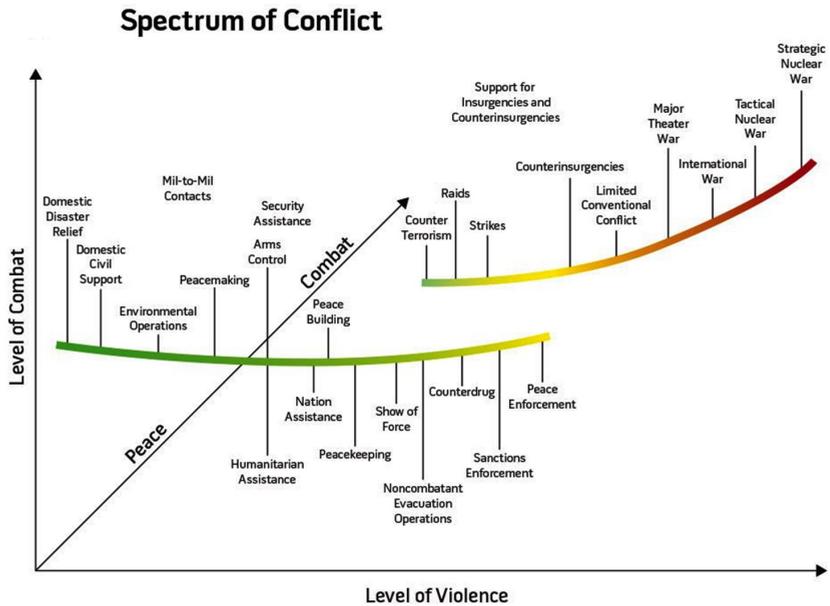


Figure 25. Spectrum of conflict. Source: National Defence University Press. <http://ndupress.ndu.edu/Media/News/NewsArticleView/tabid/7849/Article/577570/jfq-75-determining-hostile-intent-in-cyberspace.aspx>

Figure 25 clearly demonstrates the spectrum of missions and tasks which, in theory, the armed forces have to face up to. The institutional centre of gravity, where the main capabilities of the Armed Forces can be found, has a lot to do with a series of factors such as strategic culture, military history, doctrine, doctrinal preferences, the importance and influence of the industrial-military complex, etc. Although armed forces prepare to cover the whole spectrum, historically it is easier to find them at one of the extremes rather than right in the middle. The US armed forces, for example, still retain a structure, capabilities and doctrine based on the Cold War. These have been modified gradually to adapt to the long campaigns of insurgency in Iraq and Afghanistan. Currently they are trying to push doctrine towards the so-called «air-naval battle», one focused on defeating anti-access strategies, according to the Asian pivot announced by President Obama.

If we look at recent experiences we can see that the capacity of adapting is true at tactical and operational levels (although slow) but is not so easy at strategic levels of warfare. Afghanistan and Iraq are examples of the growing frustration that western Armed Forces were subjected to. Unbeatable on the field of battle, they have been incapable in many instances of transforming their operational achievements into strategic goals or permanent policies. They are increasingly being obliged to carry out tasks for which they were not originally conceived, equipped or trained.

In 1994, three years after the successful end of the Desert Storm campaign, a book was published called *Certain Victory*. It told in full detail the role of the US Army in the ground operations for liberating Kuwait. The book looked at the path the US Armed Forces had taken from the humiliation in Vietnam to victory in Kuwait. From the professionalization process from 1973 to the adoption of air-land battle as the doctrine for operations, the adoption of changed training and the so-called «Big Five». These were the arms systems that made victory possible: the M-1 Abrams tank, the VCI¹⁹ Bradley, the Apache and Black Hawk helicopters and the Patriot missile. The same systems were also protagonists of the sequel war in 2003, in improved or evolved versions.

The «Iraqi Freedom» campaign of 2003 was intended to be a 'light' version of that of 1991, thanks to the insistence of Secretary Rumsfeld. He had tried to slim down the forces and implement the so-called transformation (another military revolution). Along with the ground-based part of the plan an air version was implemented with the unfortunate name of «Shock and Awe». As is usual in the theories of air power, the air doctrines associated by authors such as Warden and Deptula heralded an easy victory based on strategic bombing. The phase of stabilization – what to do with Iraq when the cannons stopped firing – remained in the inkpot of planning. Just as with Napoleon in 1812 in Moscow and the Germans in the depths of Russia in 1941, the Americans realised that the success of a campaign did not guarantee victory or the materialization of a grand strategy, especially one that is inexistent or simply wrong.

The key may be found in the indiscriminate use of force, where the military tool carries the false assumption that technology, in some way, is capable of eliminating the final uncertainty about the result.

This American technological superiority, which in other spheres has provoked asymmetric responses such as terrorism, insurgencies or hybrid conflicts such as that in Ukraine, has pushed its allies towards inter-operability, the purchase of advanced materiel, and in many cases to copy their doctrine. There is always a certain tension between the European and American allies over the effort put into defence and the growing technological gap between the two sides of the Atlantic.

If, moreover, there is no clear consensus about the type of armed forces that are needed and the doctrine of use, along with the group of associated capabilities, we find ourselves with the reality of having arms inventories that were designed and acquired for another era. For example, Spain has arms systems like the ICV Pizarro and the excellent Leopard 2E, both designed for the Cold War which are still being paid for and until now have not been used in any of the numerous foreign operations in

¹⁹ Infantry Combat Vehicle.

which the Spanish Army has participated. It is interesting in this case to compare the Leopard with the Merkava, both of which are of similar generations. The Merkava, in its different versions, is a tank designed to fight in the Golan Heights with an enemy in mind, tanks originally from the Soviet Union like the T-62 in the Syrian Army. However, the last confrontations between the Merkava and Soviet-built tanks were during the «Peace for Galilee» campaign of 1982. Since then the Merkava has had to face up more to the anti-tank weapons of Hezbollah or the IEDs of Hamas in the Gaza Strip than an attack like the one during the Yom Kippur War of 1973. But, at least, in the face of the «Arab revolutions» there is still a threat on the northern front, on the frontiers with Syria and Lebanon. The Leopard, on the other hand, was designed for the Central European Plain and to close off to the Soviet Armies the famous Fulda gap. It is a very technologically advanced tank, capable before and now of defeating a whole panoply of adversaries that the now defunct Soviet Army could put on to the battlefield.

The idea was to provide a modern version of the Tiger I (or rather the Panther), with the same superiority over Soviet tanks like the T-34 but none of the weaknesses of the previous 'big cat'. That is why it is always questionable for Spain to buy such a modern tank. When we started to acquire the first ones in 1998 (the Leopard 2A4), the Cold War had already been finished for several years. It can be argued that having this type of weapon acts as dissuasion to possible enemies and that our membership of NATO obliges us to have a certain level of arms that are inter-operable with our allies, without mentioning the necessity of maintaining an industrial base. The same debate is going on on both sides of the Atlantic. That our modern arms systems have little in common with some of the current threats, that they do not always synchronize with strategy as they are projects that pre-date their manufacture, because development periods are very different and are also fairly costly, not just for medium size powers such as Spain but also for countries such as the UK and France. On the other hand, producing an arms system like the Leopard 2E in Spain brings important industrial returns and it is one of the few technologies where one can still talk of western superiority and national production. The fact that it has not been used in overseas operations does not mean that it is not fulfilling an important dissuasive role or that it may be used in the future. It is a technology that is so difficult to develop that if abandoned it can be given up as lost. For all this, no country can simply ignore its defence and not maintain a solid industrial base that enables it to equip its Armed Forces with essential capabilities. In the case of the Leopard, it is the capability of carrying out integrated weapons operations with the rest of the Alliance. The military industrial base can only be externalized to a certain point, not beyond the point of vital national interests. What is more, although the great battle tanks were designed for combating similar weapons they have been used successfully (by countries with the

A geo-strategic view of defence

political will to do so) in scenarios as different as Iraq and Afghanistan. Just as with the example of the Leopard 2E, one can talk of other arms systems and capabilities.

As I have tried to demonstrate in this last part, determining military capabilities, relating them with doctrine and security strategy and adapting them to the changes in risks and threats is not an easy path. However, what should never be allowed to happen is to lose the industrial capability that allows us to produce arms systems such as the Leopard, the Eurofighter and the F-100 frigate.

Conclusions

This part of the study has been aimed at giving a bird's eye view of the factors that in some way affect defence and security. The point of view has been geo-strategic, trying to stress those characteristics that need to be taken into account in defining the general features of an industrial strategy for defence. As a final reflection, this industrial strategy should be synchronized with the national security strategy and take into account risks and threats when defined. Maintaining an industrial base for defence should be an industrial and political priority, because of its implications for the wealth of the country, for technological capability, and the security that it brings.

Also, belonging to collective defence organizations such as NATO and the collective security system of the United Nations does not cover all the risks and threats to Spain's security. That is why it is also necessary to define how and with what capabilities the country should respond to threats that are not shared.

The global situation, the proliferation of risks and threats, the emerging of rivals to a western concept of civilization based on Human Rights, freedom, democracy and economic liberalism, geopolitical and economic motives, are all reasons for maintaining the capability to dissuade and a military capability that is linked to a strong defence industrial base.

The definition of military capabilities is part of military strategy which in turn should be developed within the framework of the National Security Strategy. There should always be a balance between military needs and the preservation of an industrial base for defence.

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The industrial policy of Spain

Begoña Cristeto Blasco

Chapter two

Abstract

The economic crisis that manifested itself with particular virulence internationally since 2011, has affected uniquely Spain for its intensity, complexity and difficulties to overcome them.

Beyond cyclical aspects, the crisis has been especially deep in our country for a series of structural, macroeconomic and financial imbalances that had been accumulating in the previous stage of high growth. Suffice to name the real estate bubble, excessive debt or loss of competitiveness of our economy.

This situation made it urgent to adopt a series of reforms that ultimately would allow Spain to have a new model of economic growth, correcting past imbalances and create conditions allowing to promote economic and business activity. So, after more than three years have been marked by an ambitious reform agenda, we can now say that they have carried out have enabled the Spanish economy regain the confidence of international markets, gain efficiency, flexibility and ability to compete, so already beginning to see tangible results.

Industrial policy has emerged as one of the engines of growth of the Spanish economy and in this article; we review the measures undertaken by the various ministerial departments, coordinated by the Ministry

of Industry, Energy and Tourism, within the framework of Agenda for strengthening the industrial sector in Spain.

KeyWords

Industry, automotive industry, space industry, defence industry, aircraft industry, shipbuilding, Enisa, Cersa, Industry 4.0.

Introduction

The Spanish economy has run up three consecutive quarters of sustained growth, which reaffirms our conviction that we are now on the right path for economic recovery.

It is true that there are still major imbalances in our economy, the labour market being the most important one. But it is also certain that this road to recovery in which we are now immersed is enabling us to also reduce the high level of unemployment.

The gross domestic product (GDP) generated by the Spanish economy in the first quarter of 2015 was 0.9% up on the previous quarter and represented an annual growth of 2.6% compared with the start of the previous year. This good starting point and the good expectations for the economy led the government to revise its projected growth figures for 2015 up from 2% to 2.9%.

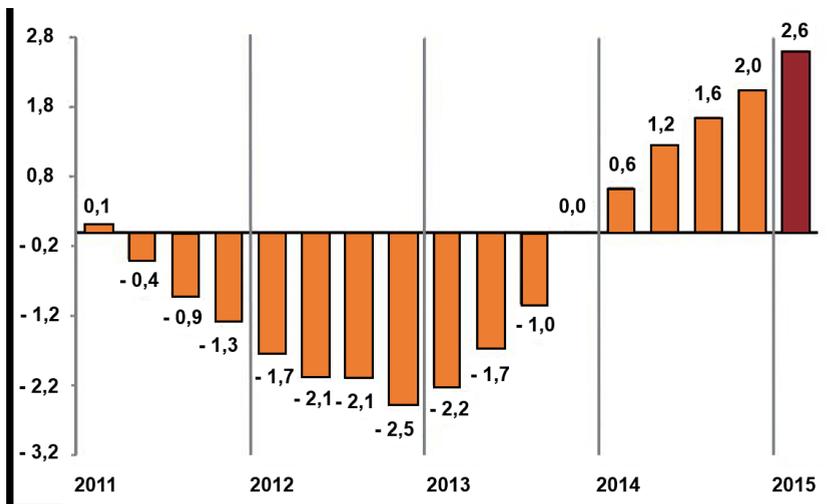


Figure 1. Change in GDP. Annual rates. Source: INE.

This favourable evolution in the Spanish economy contrasts with the less favourable behaviour of other European economies, especially of the stronger countries in the European Union.

In the first quarter of 2015 the Eurozone countries (EUM-18) registered positive growth of 0.4%, a decimal point above that of the previous quarter. On the other hand, the European Union as a whole (EU-28), registered a variation of 0.4%, the same as the previous quarter.

France and Italy moved from stagnation in the last quarter of 2014 to growth in the first of 2015. But in Germany the progress was lower than that recorded in the last quarter of 2014 (0.3% against 0.7%).

Spain, without doubt, is showing the most dynamic economy in the Eurozone, but are we growing sufficiently to create employment? According to Okun's Law, the GDP needs to grow by a minimum of 2-3% to start to create jobs, but it can be seen each month from the latest data from the survey of people in work that this myth is being proved wrong. The number of people working has grown by 504,200 in the past 12 months, with an annual variation of 2.9%. Of the total of new jobs in the last 12 months, 142,500 correspond to the industrial sector.

The Spanish economy has begun to show signs of general improvement, and these improvements have translated to industry. The industrial production index for March 2015 reflected growth of 2.9% over the same month of the previous year, running up 17 months of positive figures, the best period of growth since the start of the crisis.

In keeping with this favourable evolution of manufacturing activity, other indicators also showed growth. Such was the case with investment in new machinery, which maintained sustained growth over five months and, in turn, contributed to the growth in gross fixed capital.

In recent months confidence has kept growing and various indicators such as the level of business and new orders point to favourable perspectives. The data for new orders (2.9% up on the year before) for February showed the upturn in industrial activity while the overall business index for industry that month was up 2.9% compared with the same month the previous year, which itself was a point higher than in 2014.

Among these indicators, one that stands out is the PMI¹ of manufacturing industry which, in April 2015, registered 54.2 points, prolonging the cycle of expansion that started at the beginning of the year and demonstrating the solidity of improvement in the sector.

For its part, the indicator of confidence in industry, published by the European Commission, shows Spain maintaining the rise that began at the start of 2013, reaching a level not seen since the beginning of 2008. In particular, confidence compared with other business sectors, rose in industry in March, passing from -4.3 to -0.9 points.

Our economy is taking on a dynamism that was unimaginable barely two years earlier, but we have to keep working on the consolidation of this economic recovery, as well as broadening the reformist agenda. If we want to be a country with an economy that is competitive, effi-

¹ Purchasing Managers' Index.

cient, and productive we must be capable of adapting to the continual changes that are taking place on the world stage and which especially affect the industrial area.

The economic crisis has underscored the significance of industry's role as a generator of growth and jobs. Those European countries with more solid industrial sectors have less unemployment and more exports, in this way counteracting the fall in domestic demand and improving their balance of payments.

Yes, more industry, even at the cost of clashing with those who not many years ago were in favour of outsourcing our economy. And not just because of the objective data that shows the economies that have best resisted the crisis are those with a more consolidated industrial fabric, but also because the type of jobs generated by industrial companies are of better quality. Average wages are some 20% higher than other sectors and also more stable. The high multiplier effect of industry over the economy as a whole is unquestionable and, moreover, plays a key role in promoting R&D and innovation.

So the importance of the industrial sector to the economy transcends its own activity because of its direct impact on the real economy. That is how it has been seen by the majority of countries that have relaunched and strengthened their industrial sectors, as has happened in the European Union.

The Commission has drawn up an Industrial Policy Strategy that seeks not only short term solutions to the crisis that began in 2008, but to also to set out lines that in the long term will enable industry to be a key factor in sustainable economic growth.

Industry in Spain

According to recent data published by the INE, Spanish industry accounted for 16.1% of GDP², in 2014, generating more than 2.3 million jobs, which in turn represents around 13% of the national total.

The Spanish industrial fabric consists of more than 129,000 companies and is very fragmented, with 99.6% of them SMEs and just 0.4% that can be classified as large industrial companies.

² Approximate contribution to GDP through gross added value at basic prices. It includes the energy industry

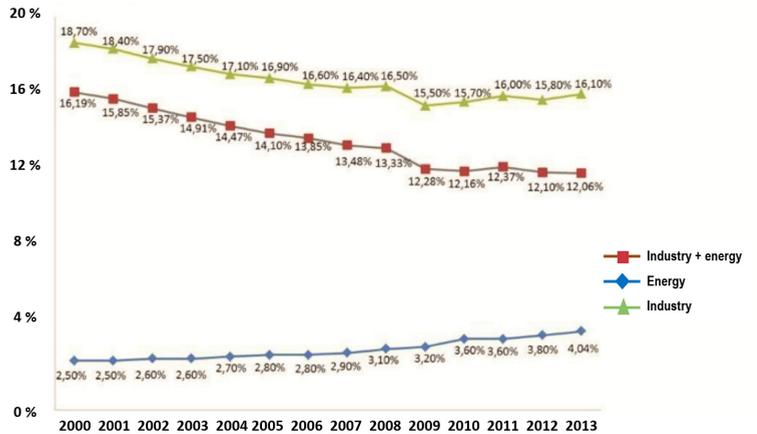


Figure 2. Participation of the industrial and energy sectors in GDP. Changes in GDP in Spain, 2000-2013. Source: Minetur.

However, it is the sector that makes the most effort in innovation and in R&D, representing 48.3% of private investment carried out in Spain in 2013 and with exports that represent about 20.5% of GDP, with annual growth of 9.7% since 2009.

Industry has a very important multiplier effect on the rest of the economy, generating indirectly and leading to 1.61 euros of GDP and 1.43 jobs being produced for each euro of GDP and direct job. However, there are sectors that stand out for their contribution to GDP and jobs and for their towing effect, such as the automotive sector, metal and food and drinks.

Given this situation, what are the challenges and opportunities facing our industry in the short and long term? To answer this question it is appropriate to carry out a quick SWOT analysis that shows up the weaknesses and strengths, both structural and current ones, as a consequence of the economic crisis.

Among the main structural weaknesses of Spanish industry what has to be mentioned first, as we saw earlier, is the small size of our companies, which lack the critical mass necessary to grow and expand internationally. In second place we should cite the lack of productivity and R&D that puts a burden on their competitiveness, a situation aggravated by a highly complex administrative and regulatory setting and rigidity in the labour market. Lastly, there is a lack of alignment between the needs of companies and the training system for professionals, and their insertion in the jobs market.

As a result of the economic crisis our industrial companies also face two current weaknesses, the difficulty in accessing finance and more expensive credit and the fall in domestic demand because of economic uncertainty and the rise in unemployment.

Among our main structural strengths, those that stand out are the importance of having top level human resources with a high level of scientific and technological qualifications, a broad and modern infrastructure and logistics network, access to markets in the European Union, North Africa and Latin America, and the fact that we are a consolidated destination for foreign investment within the European Union.

As one of the main interim strengths of the economic crisis, it is worth pointing out the reduction in unitary labour costs compared with other countries in the European Union that has been generated by labour reform. Also, the growth in exports and the European Union's push for developing the industrial sector as part of its Europe 2020 Strategy.

Industrial policy in Spain

The importance of industry in the Spanish economy and the goal of increasing its weight in the economy meant that from the start of the last legislature we were conscious of the need to articulate a series of activities that, coming under the responsibility of different ministerial departments and for scenarios as varied as energy, the environment, fiscal and labour, contributed to facilitating a favourable business environment for industry to develop in.

Industrial policy has to be supported by the other economic policies and, because of this, from the start of the legislature an active industrial policy was shaped. I do not share the neo-liberal principle maintained for years by leading economists and politicians in this country who defended that the best industrial policy is not having one. Industrial policy should be a State policy, that lasts longer than legislatures and is accepted by a broad consensus of political parties, social and business movements and by the private sector.

That is why, to face up to the principal challenges that confront the Spanish industrial sector, the Ministry of Industry has held various forums with all the economic stakeholders. These have allowed us to not only prioritize and lay down the short and medium term needs of our industry but also, above all, to establish a firm commitment to those main stakeholders in getting it going.

With this objective in mind, in 2013 a diagnosis was presented of the situation of the Spanish industrial sector. This included an analysis of how the sector had

been affected by the crisis, identifying the best practises carried out by similar countries to our own that have developed international benchmark industrial models, analyzing the main competitive advantages of

Spain, and identifying the areas with potential for improvement and lines of specific activity.

This analysis included for the whole process to culminate in the drawing up of an action plan to be shared with all the different bodies involved, both public and private. That Plan of Action was approved by the Cabinet on 11 July and constitutes the «Agenda for the strengthening of the industrial sector in Spain».

The Agenda consists of a raft of concrete and well defined activity proposals for putting into action in the short and medium term to permit improvement in the criss-crossing conditions in which Spanish industrial activity is developing. These will also contribute to the industry growing, becoming more competitive and raising its profile in the overall GDP.

The Agenda brings together actions by the Ministry of Industry, Energy and Tourism as well as from other ministerial departments and public bodies, which are targeted at facilitating a favourable business environment for the development of our industrial fabric.

It is aligned with the National Reforms Programme of 2014 and with the government's economic agenda. And, as it should be, it is fully framed within the initiatives that are being carried out at European Union level and which position industry as a key factor for growth.

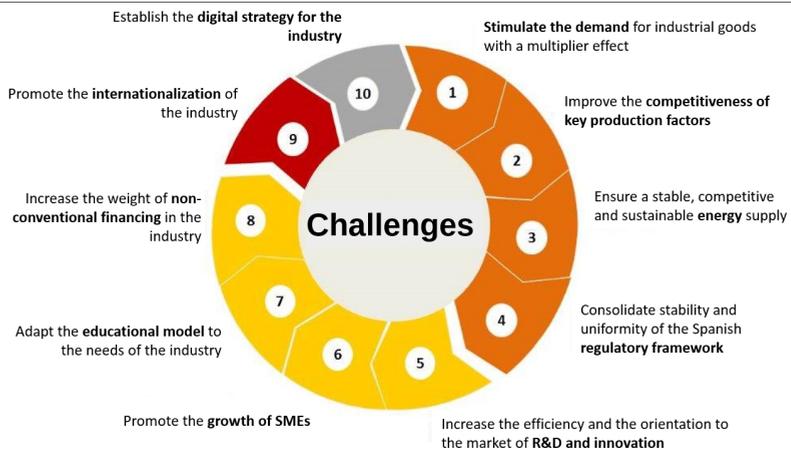


Figure 3. Challenges for the Spanish industrial sector. Agenda for strengthening the industrial sector in Spain. Source: General Secretariat for Industry and Small and Medium Size Enterprises.

The Europe 2020 strategy sets up a common objective for industry to reach 20% of GDP by 2020, a goal that is firmly supported by the Ministry of Industry, Energy and Tourism.

The Agenda consists of 97 measures grouped around 10 action points, which are the real challenges facing Spanish industry and which we will be developing.

Stimulating demand for industrial goods with a multiplying effect on the economy and promoting investment in strategic industrial sector

Throughout the last year there has been a change in the tendencies shown since the start of the crisis as regards durables and equipment, which are the most relevant for the industrial sector. It is therefore time to consolidate this positive trend.

That is why the first action point in the Agenda comprises a range of measures to temporarily stimulate the demand for industrial goods, prioritizing those sectors that have a greater pulling and multiplier effect in the economy. At the same time, these measures promote investment in industrial sectors that are strategic for their importance in terms of GDP, employment and R&D, or for the tractor effect they have on the rest of the economic sectors. Let us analyse briefly some of these.

Automotive sector

The support that the Ministry of Industry, Energy and Tourism (MINETUR) gives to the automobile sector is indisputable if we look at its importance in the industrial scene. It represents 6% of industrial Gross Value Added. In 2014 there was strong growth in production with 2.4 million vehicles being manufactured. The sector generates 250,000 jobs between manufacturers and component makers. It also represents 14% of all Spanish exports, with more than 1.9 million vehicles sent abroad in 2014, making it the third biggest export sector after capital goods and food, with an export quota of total vehicle production of above 89%.

It is necessary to highlight that in the past three years vehicle makers in our country have taken strategic decisions on the assigning of new models to Spanish factories that have resulted in 22 new models being produced in Spanish factories this year (Opel Mokka, Nissan Pulsar, e-nv200, Renault Captur, Citroën Cactus and the new Picasso, the new Mercedes Vito, the new IVECO Daily, etc.). We can talk of about five billion euros being invested over the next five years, solely in the vehicle manufacturing sector. To this we must add the 4.2 billion euros announced recently by the Volkswagen group, which is being invested between 2015 and 2019 in the two plants it has in Spain, the Seat factory in Martorell and the Volkswagen one in Navarra.

These investments and the assignment of new models will give rise to the generation of an estimated 8,000 new jobs, which could mean another 30,000 jobs in national industry for equipment and component makers.

The most successful policy for stimulating demand in a manufacturing sector carried out in the past legislature is without doubt the Plan PIVE (for replacing old vehicles), which was targeted at restoring domestic demand and strengthening production in Spain.

The balance could not be more positive. Spain is the leading producer of industrial vehicles and the second biggest producer of cars in the European Union, as well as being the ninth biggest producer of cars in the world.

Specifically, Plan PIVE³ has generated economic activity of more than 10.14 billion euros, reinforcing the growth cycle in the Spanish economy and generating fiscal income of 3.53 billion euros, thus achieving the objective of budgetary consolidation.

The group of eight plans will permit the renewal of more than one million vehicles, improving safety on the roads. We must also not forget the environmental goals involved, with a saving on CO2 emissions into the atmosphere of 1.36 billion tonnes a year and the saving of 487 million litres of fuel. This represents a reduction of 535 million euros in the energy import bill and therefore a lower energy dependency for the country.

The automobile sector is a magnificent example of production and export results that can be seen as a demonstration of a competitive industry in the currently strongly contested global environment. It is one where the responsible actions of all the stakeholders not only maintain the quality jobs that this industry creates but also enables us to compete in a way that makes us capable of generating more stable employment in the industry.

The Space sector

An industrial policy for the space sector is another of the strategic pushes carried out by the General Secretariat for Industry and Small and Medium Size Enterprises. Our push is channelled mainly through the European Space Agency (ESA). As a member of the Agency, Spain commits stipulated funds for ESA's Scientific Programme, but also contributes funds for optional programmes that may interest the national sector. It is via these two channels that Spanish industry develops state of the art technology in such a strategic environment as the space sector, thanks to the guarantee of geographical based returns for national investments in the agency.

³ The data given here is for March 2015. Still awaiting approval is PIVE 8 for an additional 225 million euros.

In 2014, the Cabinet approved a rise in the ceiling for spending with the ESA to 1.36 billion euros for the period 2014-2022. This contribution is vitally important for Spanish companies in this sector as ESA's programmes are the basis for technological training for Spanish industry. Spain's participation in the Agency has played a fundamental role in the growth of the sector.

Between 2000 and 2010, the contribution rose from approximately 100 million to 200 million euros, while the billing grew from 300 to 700 million euros. According to the European Commission, each euro of public investment in the sector can generate more than ten times that figure.

The sector's turnover is more than 730 million euros and it provides direct employment for more than 3,400 people. Most of these are very highly qualified, 65% of them with higher university degrees.

Thanks to the work carried out through the ESA, the industry has gone from producing low added value equipment to be able to design and manufacture complete and highly complex satellites. Spain is currently in the final stages of developing satellite systems for the National Earth Observation Programme (PNOT) that will ensure complete coverage of its territory with high, medium and low resolution aerospace images. It will consist of the radar satellite PAZ, with its mainly military applications, and the optical one, INGENIO, both entirely developed by the Spanish space industry.

But our activity in the space sector is not limited solely to the ESA. The General Secretariat for Industry and Small and Medium Size Enterprises also takes part in decision making and tracking of European Union programmes in space such as: the Copernicus Programme, the observation of Earth, and the SST programme for monitoring and tracking objects in space.

In recent months the General Secretariat for Industry has also launched and led the initiative for creating an Inter-ministerial Commission on Industrial and Technological Policy for Space between the different ministerial departments involved in the field, which was set up in November. The objective is to coordinate and keep track of the industrial aspects of national space policy, with the aim of defending Spain's industrial and strategic interests and to improve the industrial return on public investment in the sector.

Aeronautical sector

The Spanish aeronautical industry occupies fifth place in Europe and eighth globally. It has a turnover of nearly seven billion euros, dedicates 11% of this to R&D and innovation, and provides jobs for more than 38,000

people, 55% of them with higher qualifications. It is also a genuine export sector with more than 80% of its turnover coming from international markets.

Our industry is a world leader in certain sub sectors such as airplane structures, air navigation systems, low pressure turbines, military planes etc.

It is also one of the most important assets for our country, which accounts for our historic baking on Airbus and our belonging to the EADS group, now part of the Airbus group.

This company alone represents 70% of the aerospace sector in Spain with 11,000 direct jobs and a turnover of 4.5 billion. Various Airbus production facilities are located in Spain, including those for Airbus Helicopters and Airbus Defence and Space. The biggest is the shared installation at Getafe, near Madrid, where some 6,000 employees work on military and civilian aircraft. Other factories are to be found in Madrid, Toledo (Illescas), Seville, Cádiz and Albacete.

One Spanish asset that is highly important for Airbus is the country's capacity to develop, manufacture and certify a complete aircraft. Spain also plays host to an Airbus Centre for Excellence for the composite elements used in the structure and for aerodynamic carbon fibre parts.

In the civil field, Spain participates, among others, in the following programmes: the A320 family, the A330 and in the future A330 neo, as well as the A380 and the A350 XWB.

The participation of the Spanish subsidiary in these aircraft has kept on growing and has now reached approximately 11% in the case of the A350 XWB. Composite materials have been one of the specializations of this Spanish subsidiary. Among other elements produced here are the horizontal stabilizers for all the Airbus aircraft. In the case of the A380 they have also developed and manufacture the tail sections of the aircraft and, with the company's latest model, the A350XWB, the so-called Section 19 and the lower coverings for the wings.

In the military field, Airbus Defence and Space has a noteworthy presence in Spain as our country, among other things, leads programmes for military transport and combat aircraft programmes. It employs more than 7,000 people. Among the main programmes it is responsible for are the Eurofighter, military derivatives of Airbus planes (in flight refuellers), the C295, C235, and C212 military transports and the A400M heavy transport plane which is assembled and delivered from the factory in Seville.

MINETUR has given financial support to the Airbus Group for both civil and military divisions in the form of returnable risk advances.

Naval sector

The naval construction sector is one that has international prestige for its high quality standards in producing sophisticated ships and which exports 90% of its production. However, it is also a sector that is traditionally affected by different economic crises and in recent years has gone through reconversions.

The activity of the General Secretariat for Industry and Small and Medium Size Enterprises in this sector is mainly targeted at favouring the modernization of shipyards to reach the necessary levels of competitiveness.

Shipyards need support to improve their installations and to invest in innovation and R&D, to enable them to improve the products they put on the market. It is a product where securing financing is vitally important for them to compete in international markets.

In this sector, therefore, the industrial policy strategy is defined by financing schemes for the export of ships and horizontal support for construction.

These horizontal supports cover areas such as R&D and innovation and grants at 1% interest for credit contracts that help achieve financing for the exporting of ships, based on the Royal Decree 442/1994 covering incentives and the financing of naval construction.

But without doubt the most relevant activity in the past year has been the defence mounted by MINETUR for the Spanish naval sector in the proceedings opened by the European Commission on the former tax-lease system. This channelled at the efforts of the administrations and shareholders involved, in such a way that we managed to substantially minimize the impact on the sector of the Commission's decision on the former system.

Simultaneously, the Ministry of Industry, Energy and Tourism developed jointly with the Treasury Ministry and the European Commission a new tax release regime for Spain.

Since its approval, the General Secretariat for Industry has carried out an intense promotion of this new regime with the aim of helping recoup investor confidence in the sector. At present Spanish shipyards are immersed in numerous trade missions in which they have once again demonstrated their high levels of competitiveness. So far this has translated into 17 contracts worth 415 million euros and is generating 1.8 million work hours for our shipyards.

The defence sector

We cannot talk about strategic industrial sectors of our economy without making a special mention of the defence industry.

Since 1996, as the outcome of an agreement between the Ministry of Defence and the General Secretariat of Industry, there has been pre-financing of what are called the Principal Programmes of Defence.

These technological and industrial projects related to modernization programmes for the Armed Forces provide support for industrial innovation that is regarded as being of high strategic value.

Their importance can be measured by the challenges presented in transferring this same technology for use in other sectors and for the important tractor effect it has, both in jobs in auxiliary industries and for sub-contractors. We must not forget that this sector has a turnover of more than four billion euros and provides employment for more than 17,500 people.

Using this framework, programmes such as the F100 and F105 frigates, the combat supply ships, the A400M transport plane, the Tigre helicopter, the Spike missiles, the Leopard tanks, Pizarro armoured vehicles and the Eurofighter strike aircraft have been financed.

In 2014 the Ministry of Industry continued financing some of the ongoing programmes, in particular the S-80 submarines, the NH90 helicopters, and the A400M military transport aircraft. To cover these programmes MINETUR allotted 343.6 million euros that year.

In the 2015 budget 220 million euros were added for the incorporation of the programme to build the maritime action (BAM) patrol ships and to finance technological programmes connected with the F110 frigates and the 8x8 armoured vehicles. These programmes will be pre-financed by MINETUR and will contribute to our defence industrial sector continuing to gain new strategic and technological capabilities that are essential for national defence and security, as well as putting it in the best situation for accessing foreign markets.

Improve the competitiveness of key production factors

In an increasingly globalized world one cannot speak of strengthening the industrial sector without looking at policies for optimising the costs of production and permit improvements in the competitiveness of companies. I refer here basically to logistical, labour, technological and energy costs.

As far as logistical costs are concerned, Spain needs to keep promoting its competitive advantages to consolidate itself as a benchmark location in Europe.

Thanks to the investments carried out in recent years, Spain has a wide and modern network of infrastructure that is internationally renowned and has enabled us to position ourselves as the fourth country in the Eu-

ropean Union based on the volume of goods managed by our ports. Ten per cent of these have their origin or destination in Latin America and 20% Africa. However, our special geographical situation must be taken into account, given its peripheral nature, far from the main markets and suppliers. That is why we must continue to look more deeply into improvements in areas such as port management, maritime transport, and goods shipments by rail and by road.

The current challenges for the country from the logistics point of view are basically two: the need to reduce logistics and transport costs and the opportunity to improve transport infrastructure and communications networks.

Transport costs are decisive for the industrial sector. That is why in the first half of 2015 an order was scheduled from the Ministry of Development to authorize the raising of the height of cargo shipments to 4.5 metres and for the use of vehicles up to 25.25 metres long. This measure will allow for an increase in competitiveness in sectors such as the automobile one, with large scale and light weight transports. However, the demand from the sector does not stop here. They want to raise the maximum permitted load for professional transport to 44 tonnes. Only in that way will they be able to compete on equal conditions with truckers in France and Portugal, countries that have allowed this type of transport for some time.

As regards port costs, in 2014 the tariff on port use was reduced by 5% and on occupation by 8.5%, which were frozen for 2015. As for handling costs, a new Royal Decree was scheduled for 2015 to modify the law for ports relating to stevedore activities, to reduce costs and to align them with tariffs in other European ports. The introduction by the Development Ministry of a port system to simplify bureaucratic procedures, also scheduled for 2015, should also help boost this form of transport.

As regards the transport of goods, the government has worked intensely on finalizing the liberalization of the railways sector. There are now nine private operators apart from (state-owned) RENFE, holding a 20% market share. With these measures, RENFE upped the use of transporting goods by rail by 7.4% in 2014 while the private operators achieved a 24% rise. In addition to this the Development Ministry is working on improving the railway infrastructure for goods, extending the use of European standard gauge lines, constructing terminals of 750 sq metres, adapting gauges, getting rid of bottlenecks and improving access to large cities, and improving the security system through the creation of a State Agency for Rail Security.

«The Plan of measures for growth, competitiveness and efficiency» that was approved by the government in 2014 aims to promote sustainable mobility plans at town halls, sustainable transport to work centres, man-

agement of road transport fleets and courses in efficient driving to be financed by the National Fund for Energy Efficiency.

The 2013 national budget included for the first time the application of a mechanism for evaluating the criteria of energy efficiency in the concession of state aid to public transport systems. This means any aid given to autonomous or other local governments that is destined for public transport will be on condition that 5% of the amount assigned will be for a corresponding Plan for Sustainable Mobility in line with the Spanish Sustainable Mobility Strategy.

As for improvements in transport infrastructure and communications networks, the government presented in November 2013 a logistics strategy from the Development Ministry which contemplates an ambitious investment programme in an integrated plan for developing national logistics, with concrete measures for each mode of transport as well as for inter-modal transport.

Parallel to this, the Royal Decree 8/2014 included the approval of urgent measures for growth in competitiveness and efficiency, introducing specific measures that encourage inter-modal transport. Specifically, it modified the Port and Merchant Marine Law to facilitate inter-modal traffic between maritime, land-based and rail. Among other tools it created a fund for port accessibility that, through the generation of one billion euros over the next 10 years, will permit an improvement in inter-modal connections at the entrance to ports. It also foresees an increase in the length of concessions for port companies that invest in improvements at the port or in its connections, and allowances of up to 50% for modal interchange between maritime and rail transport.

As for connections with the European Union, work is in progress on promoting sea routes over short distances and the starting up of new sea highways such as the Vigo-Nantes corridor. This began operating in January 2015 and has meant a reduction in logistic and transport costs for companies in direct connections with France. Work is also going ahead on re-establishing the Gijón-Nantes corridor. As for Mediterranean corridors that permit connection between Valencia and Barcelona and the main Italian ports, these are already functioning under a private scheme, without the need for subsidies.

With rail transport, work is being carried out on implanting an UIC gauge on existing conventional lines, the construction of rail corridors for the Mediterranean and the Atlantic, and the adoption of the European gauge. In 2014 the budget to cover this at the Development Ministry rose to more than one billion euros. In 2015 the Ministry will have destined 1.03 billion euros to the northern hub for the Atlantic corridor and 1.4 billion euros to the Mediterranean corridor, 35% more than in the previous year. In 2015,

30 million euros was earmarked for the renovation of the existing line between Antequera and the Port of Algeciras.

Meanwhile, improvements in telecoms networks will facilitate the adoption and use by companies of TICs and a reduction in their costs. The Digital Agenda for Spain, approved by the Cabinet in February 2013, includes a «Plan for Telecommunications and Ultra Fast Networks» with the overall goal of promoting the deployment of ultra-rapid broad band access, both for fixed and mobile phones, to the general public, companies and government. The objectives of the plan are to reach 50% of the population with a coverage of more than 100 Mbps, to reach 25% of homes connected to Next Generation Access (NGA) networks and 75% of the population with 4G coverage.

This Plan was set out in the 9/2014 Law on Telecommunications and through support mechanisms drawn up by the Secretary of State for Telecommunications and the Information Society (SETSI), with economic support for the 2013-2015 period of 300 million euros.

From the point of view of labour costs, we have to take into account that since the start of the economic crisis Spain has made a major effort to adjust unitary labour costs. They are now 10% below the average for the European Union and some 15-20% cheaper than in countries such as Italy, France and Germany.

The labour reform carried out by the government favours internal flexibility in companies, facilitating the introduction of measures such as linking pay increases to company results, the double salary scale, the creation of flexi hours, and the recovery of part of the reductions in the working day that had occurred in some sectors. At the same time greater flexibility has been introduced for collective bargaining in wage negotiations and a change in model for professional training. All this has had a direct effect on reducing the labour costs supported by industry.

However, wage costs remain high in many sectors which have to compete with Asian and East European countries. That is why, despite the heavy weighting they have on total company costs, they have to be seen as another cost of competitiveness, but not as the element on which the industrial competitiveness of our country should be based.

On the other hand, another of the main factors in business competitiveness is technology and the adoption of Information and Communication Technology (ICT) in all a company's production and management processes. With this goal, the Digital Agenda for Spain incorporates the ICT Plan for SMEs and e-commerce. Among the objectives of this plan is to raise the number of companies that send or receive bills electronically to 40%, and that SMEs that purchase or sell on line reach 33% in 2016.

Standing out in the Plan are actions for promoting e-commerce. Among these, the most relevant is the programme «Mentoring in e-commerce» which involves financial support of up to 80% of the total bill. It is aimed at developing and strengthening the capacity of SMEs to expand and make the most of their sales through new channels, adopting a commercial strategy for starting online sales projects, and facilitating their positioning on the internet. In the 2013-2014 period, 440 SMEs and freelance workers were supported with aid amounting to more than 28 million euros.

The «ICT Plan for SMEs and e-commerce» is also aimed at providing incentives for the use of ICT by SMEs, ones carried out preferably through eCloud solutions. To achieve this, work is in progress on a «Programme for Promoting demand for eCloud Solutions for SMEs», backed with 135 million euros.

Improvement in industry competitiveness has also been achieved with the Development and Innovation Plan for the ICT sector within the Digital Agenda for Spain. This Plan promotes R&D and innovation in ICT, especially for SMEs, through different annual official announcements. The amount spent on this market in the 2013-2015 period was 600 million, between grants and loans. For 2015 the amount was 140 million euros.

Also, the Secretary of State for Telecommunications and the Information Society have presented a Complete Plan for Intelligent Cities, which is being carried out by Red.es. The Plan focuses on helping cities in the process of transforming into intelligent cities through the drawing up of a White Paper that describes all the digital services that are currently offered by town halls. It looks at projects that demonstrate the efficiency of ICT in reducing costs, improving public satisfaction and the creation of new business models, the development and growth of the ICT industry, and in the communication and publicising of the Plan.

Finally, work is going ahead to digitalize the industry, making the most of the competitive benefits offered by the intensive use of ICTs to promote their use in companies to achieve products with greater added value that in turn suppose an increase in the competitiveness of companies. In this context, the Ministry of Industry, Energy and Tourism, through a public-private collaboration agreement, is working on a «Digitalization Plan for Industry», the aim of which is to establish strategic guidelines that enable the Spanish industrial fabric to benefit from the intensive use of information and communication technologies in their production processes and in all aspects of their activities.

Ensure a stable, competitive and sustainable energy supply

Lastly, one of the key manufacturing factors is without doubt the cost of energy. Access to competitive sources of energy is fundamental in deci-

sion making when investing in new plants and for determining the competitiveness of companies in international markets.

To achieve this it is necessary to complete reforms in the gas and electric sectors, harmonizing the demand for a sustainable economy and a financial system that preserves the competitiveness of industry by guaranteeing supply at the lowest cost possible. This is why, since the start of the last legislature, it was a priority of the government to limit these costs as far as possible, and why it put so much effort into reforming the regulatory framework for the electrical sector. This reform was approved with the Law 24/2013 for the Electrical Sector, and completed and articulated through 16 laws and royal decrees published since 2012.

Another factor that increases the costs of electricity in Spain and makes the integration of renewable sources difficult – causing high levels of volatility on the market – is the low level of electricity interconnection with the rest of Europe, estimated to be 3% of demand and at 1.4% of the total installed capacity. However, the efforts of the government, the will of the European Council and of the Commission and the investments that are going to be made through the Investment Plan for Europe will make it possible to finance projects that increase the level of electricity connectivity. The goal is to reach 10% in the next few years. As a first step, new interconnections with France that were inaugurated in February 2014 and became operative in June will permit the doubling of interchange capacity between the two countries, passing from the current 3% of demand to 6%. What is needed is to promote the internal market for advanced energy towards achieving integrated infrastructure at a Community level.

Lastly, the start up of the National Fund for Energy Efficiency, created under Law 18/2014, covers the approval of urgent measures for growth, competitiveness and efficiency. This will permit the introduction of economic and financial support mechanisms aimed at increasing energy efficiency in different sectors. It is necessary for achieving objectives established in the Directive on Energy Efficiency. This fund is supported by up to 350 million euros a year from European structural funds, which will cover 35% of the costs, the rest coming from liquidations through the system of income from auctions on emission rights and from budgetary allocations.

Relevant measures that have been put into action include support for improving technology in equipment and industrial processes through the creation by the Institute for the Diversification and Saving of Energy (IDEA) of an aid line to help industry invest in energy efficiency. Other measures involve the exploration and exploitation of non conventional natural gas and other sources of energy, measures to promote development and technological implementation in setting up intelligent electricity networks, and electricity tariffs that are adapted to supply and demand.

***Reinforcing the stability and uniformity of
the Spanish regulatory framework***

But to improve the competitiveness of our industry, as well as demand stimulation measures and improving key productive factors it is also necessary to establish measures aimed at reinforcing the stability and uniformity of the Spanish regulatory framework. It is sufficient to point out two reasons for this. In the first place, one cannot analyse the industrial sector in Spain without taking into account what direct foreign investment has signified in its development. Secondly, it is necessary to reinforce the unity of the market as an essential economic principle for the Spanish economy to function competitively.

According to data published by Invest in Spain, foreign investment excluding the so-called Entidades de Tenencia de Valores Extranjeros (ETVEs, which profit from capital movements and fiscal dumping) reached 17.62 billion euros in 2014. This was 9.8% more than in 2013 (16.04 billion), according to data from the Registry of Foreign Investments at the Ministry of Economy and Competitiveness. This was the fifth highest figure since 2000 and came about at a time of global retreat from investment, which fell by 8%, and an even more pronounced shrinkage in developed countries (-13,9%) according to the latest statistics from UNCTAD.

In net terms⁴, the increase in investment in production was higher still, some 18.8%, reaching 13.8 billion euros (11.62 billion in 2013). This positive evolution is the result of the greater influx of foreign capital on one hand and the brake on disinvestment, which intensified compared with 2013. Disinvestment in production reached 3.8 billion euros, 13.6% less than what was registered in 2013 (4.42 billion euros).

For Spain's autonomous regions it should be noted that the foreign investment received is highly concentrated, because of the headquarters effect. That is to say, from a sharing out of investment that is in keeping with where the headquarters of the company is located. As most of these headquarters are located in the regions of Madrid and Catalonia, these communities received 49% and 17% of the total - 8.72 billion euros and 2.96 billion respectively. This represented an increase of 0.6% in Madrid and a decrease of 15.8% in the case of Catalonia. What is remarkable is the major increase seen in the Basque Country (1.40 billion, equivalent to 8% of the total and a year on year increase of 28.5%) and in the Valencia region (808 million euros, 4.6% of the total and with an increase of 381.2%).

There are more than 12,400 companies with foreign capital in Spain, employing more than 1.2 million people, which represents 6.6% of the national total.

⁴ Gross investment minus disinvestment.

It is indisputable that foreign investment has played and continues to play a fundamental role in the development of the Spanish industrial sector. That is why the need to work for achieving greater stability and uniformity in the Spanish regulatory system is indispensable. For the IED to continue playing this role, one of the areas where progress is needed is market unity.

Market unity is an essential economic principle for the competitive functioning of the Spanish economy and, as a matter of fact, is reflected in Article 139 of the Constitution. This article expressly impedes the adoption of measures that directly or indirectly block the free circulation of people and of goods throughout Spanish territory.

With the aim of making the principle of market unity effective, a number of important efforts have been made over the last few decades. However, in spite of the measures that have been taken, fragmentation remains in the Spanish market, making it difficult for effective competition and impeding the opportunity to benefit from the economy of scale that is offered by larger markets. This is a disincentive to investment and, in short, cuts productivity, competitiveness, economic growth and employment, with the important costs that this signifies in terms of prosperity, employment and the general welfare of citizens.

The need to eliminate this cost, along with the obstacles and hindrances that derive from the growth in regulations, has been one of the main demands in recent years. That is why, in May 2012, the Economic Affairs Commission launched the Guarantee of Market Unity Programme, based on three action points:

First of these was the drawing of a frame of reference for the program that was approved under law 20/2013, December 9, guarantee of the unity of market.

Then came the «Normative Rationalization Plan», which unfolded in parallel with the processing of the Law, and was aimed at efficiently avoiding the problems caused by this lack of market unity and the unnecessary and disproportionate restrictions on economic activity. Its main goals were firstly to identify the regulations that affect each sector, to detect possible obstacles to market unity set up by the different levels of administration. Then to evaluate that regulation, to note which parts were seen as affecting this unity, what needed to be done to them, and to prepare proposals for modifying them, both at ministerial and at local administrative level. All this to reduce the regulatory burden and revoke those rules that duplicated, were contradictory, or hindered market unity.

The third and last point was to set up administrative cooperation measures to allow the practical application of the law.

According to estimates from the Ministry of Economy and Competitiveness, the application of this work programme could in the long term result in growth of 1.52% in GDP.

In the context of market unity and being able to follow the progress of the Programme, the Ministry presents information every two weeks to the General Commission of the Secretaries and Deputy Secretaries of State. This includes details of new commitments, the incorporation of projects for the Platform of Regulatory Cooperation and information on conferences and records.

The plenary session of the Sector Conference on Industry and SMEs met twice in the last year, creating two working groups. One of these was to analyze and revise the Industry Law and the other to look at the rules, to study the problems with these and the way they are applied and interpreted. The second group has reached agreement on criteria in areas such as the technical inspection of vehicles (ITVs) and aspects of industrial safety.

It is essential that we keep moving forward with the execution of this Work Programme, developing and introducing what is envisaged for the Market Unity Law and the Regulation Rationalization Plan. The aim is to eliminate, for example, duplications in administrative management and the dispersal of competencies among different bodies which look at different aspects of the same industrial activity.

Increasing efficiency and the market orientation of R & D and innovation

It is true that since the 1990s Spain has made a major effort that has led to significant progress over these years. Spending on R&D and innovation has been positive and is growing. However, the effort made by the government to increase the level of spending has not been enough to match that in the European Union. The distance between Spain and the leading countries is still considerable, especially when one looks at the investment in R&D and innovation by business sector.

Spanish investment in R&D and innovation as a percentage of GDP is 1.3%, based on the amounts paid out by the private sector, the public sector and the educational sector. The average in the European Union is 2.2%. Standing out among our fellow members are Finland, with a percentage of 3.6% of GDP, Sweden at 3.4%, followed by Denmark (3%). Germany (2.9%) and France (2.3%). Outside the European Union, the country that stands out is South Korea where the investment level is 4%. Korea also has the highest proportion of private investment, which represents 80% of the total.

The breakdown of investment in R&D and innovation in Spain shows the business sector providing 54%, the public sector 15%, and the educational sector 31%. To promote the necessary convergence with the EU and to improve business competitiveness, the Spanish Strategy on Science, Technology and Innovation has the goal of boosting private investment in the country's R&D AND INNOVATION to 60% by 2020.

To reach this ambitious goal requires the drawing up of an R&D and innovation policy that is targeted at developing initiatives, promoting greater private spending and encouraging the transition from a theoretical model towards one in which commercial application and the generation of the corresponding economic activity prevails.

Over the last few years, measures have been introduced to reinforce financial programmes destined to promoting R&D and innovation. In 2014, 1.58 billion euros was made available, creating the conditions needed to facilitate the access of companies to financing and promoting business participation in European Community programmes and instruments such as Horizon 2020 and the FEDER funds. An example of this promotion is the «New agreement of Association and Multi Annual Operative Programme for Intelligent Growth, 2017-2020». This reflects the priorities in the distribution of FEDER funds on research and innovation activities aimed at improving the performance of companies and their capacity to absorb and apply knowledge and strengthen their competitive bases.

Separately, measures have been taken to offer fiscal incentives for investing in R&D and innovation, as, for example, those included in Articles 23, 35 and 39 of Law 27/2014 on Company Tax. Standing out among these measures are a reduction on income from certain intangible assets and deductions on activities involving research, development and technical innovation; and those included in the Royal Decree 475/2014, on Social Security allowances for researchers.

However, despite the efforts that have been made, there is little tendency towards innovation among SMEs. In Spain, the process of innovation is being stimulated not by companies but by universities and technological research centres. That is why, in many cases, research and development activities do not translate into innovation in products and services, and therefore wealth. The development of company clusters and technological and research centres is one of the most viable options for making up for this shortage.

The General Secretariat of Industry and SMEs has been trying to promote clusters as a form of cooperation between companies and to do this has reinforced the «Support Programme for Innovative Business Groups» (AEIs). The goal is to encourage the setting up and strengthening of structures that promote the development of innovative projects, and to improve the competitiveness of companies that take part in them,

especially the SMEs. With this in mind, in 2014 an ambitious reform was carried out, putting more emphasis on innovation projects being developed by clusters. Combined with more demanding access conditions to the Programme, this has helped in setting up a map of clusters that are capable of carrying out projects which benefit the companies, in line with the directives of the European Union. The programme has also served to reinforce the mechanisms for technology transfers, as universities, research centres and companies on the boards of the AElS.

In this way, collaborative spirit has been reinforced, creating a specific line of support for projects in this field. The goals are to permit collaboration between companies of different size, situated in different stages of the value chain, and to speed up the introduction of products.

Currently, there is already a significant number of recognized AElS in Spain. They are grouped together in six major sectors: transport, biotechnology, water, energy and the environment, ICT and the media, machinery and metallurgy and other industrial sectors. The AElS are distributed throughout the country, with Andalucía, Catalonia, Valencia and Madrid being the autonomous regions with the most clusters. Together they group together a little more than 5,000 companies, employ 1.25 million workers and include more than 600 research organizations, technological centres and training centres etc.

Support the growth and professionalization of Spanish industrial SMEs

If investment in R&D and innovation among our companies is still inferior to the European Union average, this situation is worse when we look at SMEs.

They account for 99.6% of the Spanish industrial fabric, but we must not forget that they generate 63% of jobs and contribute 64% of gross national added value. Their relevance implies that any policy aimed at improving Spain's position in the global economic setting has to make SMEs a priority. However, their lack of size generates disadvantages that limit not only their competitiveness and potential to grow, but also their access to international markets, sources of financing, investment in R&D, and their ability to negotiate with suppliers and clients.

That is why no government can put forward a policy for SMEs that is not targeted at promoting growth and grouping them together. If such policies are important to other activities in the industrial sector, they are urgent and indispensable if we want to facilitate the SMEs' access to the advantages of scale when it comes to financing, access to international markets and increasing their competitiveness.

The task facing the government is to create a favourable environment that promotes the growth in size of SMEs. For example, by reducing costs connected to their growth, to avoid the step up effect of regulations and modulating it in accordance with the size of the company. Also, to promote business decisions that involve them growing in size, working with the manufacturing sectors to encourage a natural increase in the average size of Spanish companies, and providing financing and knowledge.

All this, without forgetting other measures that have an effect on the growth and professionalization of SMEs, such as the need to promote smart legislation among the different levels of government. This implies a simpler set of rules and the elimination of administrative hurdles for companies, and setting up tools to increase their participation in the large scale contracts of the tractor companies.

Here we can highlight the activities carried out as part of the Integral Plan of the Spanish Institute of Foreign Trade (ICEX). The objective of the programme is for large Spanish companies that bid for contracts on the international market to have a pulling effect and serve as a tractor for SMEs. It favours integral solutions that make these companies' offers more competitive and therefore augment and consolidate the presence of these small and medium size enterprises in overseas markets.

Adapting the educational model to the needs of companies

Spanish companies undoubtedly need to grow in size to be able to compete in an increasingly globalized world, but they also need to become more professional. To achieve this it is necessary to ensure the training model fits in with what companies are really looking for, to facilitate putting a value on human capital.

In Spain we have a very qualified human capital, as is recognized internationally. It is seen by various international organizations as being one of our main strengths, one that should be a basic pillar for the recovery of our economy. However, the private sector continues to press the fact that the Spanish educational system turns its back on the real needs of companies, that it does not supply answers to the professional profiles that they demand. This disconnection provokes a lack of adaption to the knowledge and capabilities that workers need for their jobs and the need for further training at the company. This leads to increases in costs, as well as reduced productivity, until the employee is trained by the company. It also creates difficulties in finding people with the necessary training profile to correctly carry out their work.

It is necessary, therefore, to carry out actions targeted at inserting students, new professionals and the unemployed in the labour market.

These will focus basically on three action points: university training, professional training and employment training.

With university training, the measures look to strengthen the commitment of the universities to work experience in companies during the training period and the contracting of researchers in industrial companies, in what are known as industrial doctorates. Also, to promote entrepreneurship in universities.

With this in mind, the General Secretariat for Industry, in coordination with the Ministry of Education, Culture and Sport, has introduced a Programme for University Entrepreneurship. The goal is for young people who are on the point of finishing their training to find through entrepreneurship an attractive professional alternative to develop their creative potential and knowledge. The programme is aimed at complementing, where they exist, initiatives for services and activities linked to entrepreneurship, ones that have been adopted by the universities themselves or to offer them where they have not been introduced. In this way, all Spanish universities can count on the support of the government in this important task of bringing young students closer to the world of business.

Collaboration between ministries has been especially intense in the designing of this programme, with the work being carried out by the School of Industrial Organization (EOI). The initiative focuses on offering training in entrepreneurship among students, to complete their university cycle with a subject or optional model as a postgraduate Masters. The Programme not only offers entrepreneurship as an interesting alternative to being an employee, but also provides students with the necessary tools to draw up a business plan for a company project.

In the field of professional training, the measures basically consist of reform, promotion and the development of an integrated training system that is adapted to the country's manufacturing base, as well as the continual promotion of dual training.

Over the last few years the Ministries of Education and Industry have been working intensely together on the adaptation of the educational system to the needs of producers, especially in the reform, promotion and development of an integrated professional training system. This type of initiative seeks to develop and adopt the competencies and knowledge demanded by the labour system, which is why it also needs the collaboration of the Ministry of Employment and Social Security. Without doubt, this ministry is one of the main stakeholders in the challenge to create a map of adequate qualifications for tasks that the students are going to face, or those that confront novice workers and the unemployed. It is a collaboration that to be fully effective needs to rely on the companies themselves for the implantation and strengthening of the outlines of dual training.

Finally, in the field of job training, the reform of the professional training system that has been carried out tries to facilitate the greater implication of companies and workers in the work training system. It does this by reinforcing language programmes in different training cycles, carrying out tracking, study and ongoing analysis of professional qualifications and how they are evolving, as well as the development and updating of the maps showing the usefulness of university degrees.

Increasing the influence of non conventional financing in industrial companies

During the crisis the difficulty in accessing finance and its high cost put a brake on business development. This situation has been further aggravated by the heavy dependence of Spanish companies on conventional finance, to the detriment of alternative sources such as cooperative debt and risk capital, and broadening the consequences of the reduction in credit.

Only about 20% of Spanish companies resort to non bank financing, compared with more than 40% in Germany and almost 70% in the English speaking countries.

In this context, the financial tools managed by the General Secretariat for Industry are strategic instruments in the development of our industrial policy.

The objective from the financial point of view is to offer industrial companies a form of alternative financing to traditional bank sources in each of the different phases in the development of a business project, in keeping with the risks and maturity of the project.

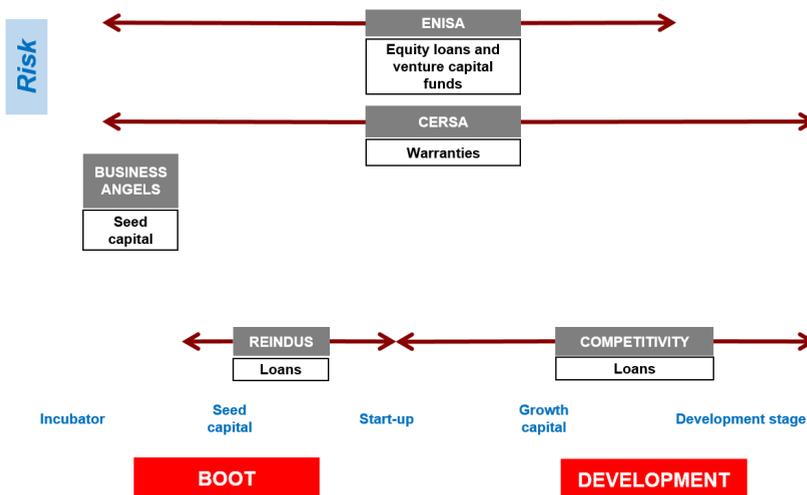


Figure 4. Minetur financial instruments for industrial investment.

The General Secretariat of Industry and SMEs has available different financial instruments that enables it to channel this alternative financing. These are the Funds for Reindustrialization and Competitiveness, loans from the National Innovation Company (ENISA), and refinancing schemes provided by 23 Spanish Reciprocal Guarantee Companies through the Spanish Refinancing Company (CERSA). There is also the support of informal investment networks, the business angels, and the promotion of Securitization Funds for financing SMEs. Let us have a brief look at each of these.

The financial support programme for reindustrialization aims to provide incentives through soft loans with advantageous conditions for creating, expanding or transferring industrial production facilities. In this way it supports the implementation of new industries, increases in production capacity and relocations to gain competitiveness.

The programme covers the whole country and includes a few specific regional ones that have their own particularities from the industrial point of view, such as Ferrol, Eume Ortegá, Campo de Gibraltar, Bahía de Cádiz, Teruel, Soria, Jaén, the left bank of the Nervión, Extremadura, Lorca, the Canary Islands and El Hierro. The budget for 2015 was 409.5 million euros.

The Programme for Fomenting Industrial Competitiveness, with funding of 348.5 million euros, has three main channels. The first of these is the automobile and components industry, for the manufacture of vehicles propelled by alternative energies, including supply and recharging infrastructure. Then there is the aeronautical industry and the manufacturing sector as a whole, for supporting investment plans that improve competitiveness, thus financing the efficiency of production processes and innovation in products.

The financing of both programmes is based on a long term concession, at interest rates that are fixed at the start of the 10 years. The rates are therefore compatible with the goal of reducing public deficit. At the official announcement of the programme for 2015, the rates of interest were set at between 1.6 and 4.34%, in keeping with the credit rating of the company.

The financial support from the General Secretariat is also channelled through two societies, ENISA and CERSA, which play an essential role in business financing, especially for entrepreneurs and SMEs.

ENISA focuses its activities on financing SMEs and young entrepreneurs, to strengthen their financial structure and to carry out projects that incorporate innovation as a strategic factor in their business processes or models.

ENISA offers financing mainly through participative loans, a finance instrument halfway between a traditional loan and risk capital that considerably strengthens the financial structure of companies and has certain characteristics. It provides long term resources without interference in management. As a type of subordinated debt, it is seen as a last rank debt. Another of the participative loan's main characteristics is that it is often considered to be part of the company's own funds, with the consequent strengthening of its financial structure and enabling it to increase its debt capacity. Interest rates are linked to company profits and have long term repayment periods, usually between five and 10 years. The only guarantee demanded is a sound business project and management team.

ENISA offers companies three types of participative loans, each of them specifically targeted at particular fields and special interest groups: Young entrepreneurs, companies with a technological base, and SMEs.

Since it was established, ENISA has made more than 3,700 loans worth a total of 700 million euros. ENISA had a budget last year of 113 million euros.

Also, to promote the development of an entrepreneur ecosystem and a more competitive and specialized financial sector in the analysis of early stage projects, ENISA has an investment line with risk capital groups. Through this it prioritizes seeding phases and the setting up of initiatives based on technology and new business models. Currently it has a portfolio of investments involving 16 societies and funds.

For its part, CERSA's goal is to reinforce the Spanish system of guarantees in taking on around 50% of the risks on loans conceded to SMEs by reciprocal guarantee companies. It backs up with funds from the national budget, the guarantees these companies give out to SMEs and freelance workers.

The 23 Spanish Societies of Reciprocal Guarantee (SGR) facilitate support for associate SMEs that enables them to access medium to long term banking finance. These guarantees enable them to get financing that would otherwise not be available to them or only at a high cost.

The activity of the SGRs and CERSA is strategic at the moment, as they provide one of the most efficient tools for covering the credit risk of SMEs, in particular the smaller ones. It allows credit bodies to hand out more financing without taking on risk.

It is also an instrument that has an important multiplier effect and is efficient for channelling public resources from the state, the European Commission (CERSA-FEI agreement) and the autonomous regions, in combination with private resources and efforts.

For those interested parties, the advantages that the system of reciprocal guarantees brings is very important. Firstly, for SMEs, it is a means of access to credit for projects at a lower cost and with a longer pay back time. It is a flexible tool that covers all SMEs and their finance needs and/or solvency with a lower level of guarantees. It also offers support and advice and quick response. Secondly, for the credit entities the system of reciprocal guarantees means less exposure to risk, less capital consumption, greater liquidity in the guarantee and higher profits on the capital loaned. Lastly, the government represents an efficient channel for injecting public resources. This is not only because of the important lever it provides but also through its capillary action, reaching out to all regions and sectors and therefore providing a sense of closeness with companies and their financing needs.

Since it was set up, CERSA has enabled more than 150,000 companies to get financing worth more than 26 billion euros.

In 2014 alone, 7,500 companies received loans worth 906 million euros, giving them access to financing and investment projects.

Also, with the aim of strengthening the guarantee system, it has pushed through with the Ministry of Economy several modifications in the regulations covering the guarantees system. On one hand, the Law for the Support of Entrepreneurs and their Internationalization has pushed the minimum resources required by SGRs up to 15 million euros, with the goal of improving their loan capabilities and diversifying risk. On the other, the Bill for Fomenting Business Financing, approved by the Cabinet on 3 October, allows, among other improvements to the system, for CERSA to answer to the banks for the higher risk in the case of non-compliance with commitment to the guarantee.

As regards support for informal business networks, the so-called Business Angels, they are working on two different lines. These are: pushing the development of Business Angel Networks in Spain as a more efficient strategy for promoting the financing of innovative SMEs with high growth potential. And promoting the programme set up in 2012, the Spain Startup Co-Investment Fund, developed by ENISA as a co-investment programme for encouraging investment in start-ups, putting new energy into the risk capital market and attracting the interest of international investors to the high potential of entrepreneurship in Spain. Since its creation, a total of 113 qualified investor partners have been signed up, 24 of them foreigners, permitting the financing of 141 operations in which ENISA has invested almost 24 million euros through participative loans and has mobilized more than 66 million additional euros through private capital.

Lastly, but not for that less important, there is the Programme of Securitization of Assets for SMEs Fund (FTPYME). This financial tool allows a guarantee on part of the securitization funds emitted by the financial

bodies in exchange for at least 80% of the share issue being reinvested in loans to SMEs. Since it was set up in 2000 it has overseen the emission of 50.64 billion euros that have allowed the reinvestment of more than 40.51 billion euros in new loans for SMEs. The total guarantee from the state in these share issues has been 15.5 billion euros.

Support for the internationalization of industrial enterprises and market diversification

One of the most relevant and positive indicators for the industrial sector in the last few years has been its contribution to sustaining demand from overseas.

Spanish industry has great experience in exports and since 2009 industrial sector shipments have grown at a rate of 9% a year, helping to mitigate the impact of the economic crisis and largely compensating the fall in demand.

However, although Spain has a privileged position as a benchmark trade partner for the main economies of the European Union, we need to increase our presence in other international markets.

That is why, in the Agenda for strengthening the industrial sector in Spain there are specific action measures aimed at supporting the internationalization of industrial companies and the diversification of markets, be it to increase exports, set up business in other countries or to attract foreign investment to Spain. It also helps guide Spain's capacity to influence in defence of its commercial interests.

The measures basically involve improving those factors that have a direct impact on the internationalization of Spanish companies, such as access to financing, getting information, the availability of human resources and the need to diversify the geographical spread of Spanish exports. Special attention is paid to priority, non European Community markets.

SMEs also receive special attention, with the promotion of their internationalization through large companies carrying out international projects, these having a tractor effect on the smaller ones.

Companies are helped with mechanisms for appropriate financing to support their competitiveness in the global market, with encouragement to collaborate with multilateral financial institutions. This is covered by Law 14/2013, on Support for Entrepreneurs and their Internationalization, which includes specific provisions in article 59 that refer to Spanish participation in international financial institutions. Following the same line, and targeted at improving the coverage of foreign operations, the CESCE has made credit risk and insurance limits more flexible for exports.

Also, to solve the problem of Spanish companies in getting guaranteed loans recognized for their international bids, through a reduction in the credit qualifications of Spanish banks, it was necessary to set up mechanisms that reinforce the validity of loans emitted by Spanish entities. This was done through the Royal Decree 4/2014, to approve urgent measures for growth, competitiveness and efficiency. The decree introduced an initiative to grant guarantees and loans through ICO, aimed at taking advantage of the potential offered by different multilateral banks and international financial institutions to Spanish companies, either as financiers or as high quality guarantors in international bids.

Another success has been in pushing the tractor and tow effect between SMEs and the large Spanish companies that carry out projects overseas. This has been done through MINETUR's Plan for the Internationalization of Industrial Sectors, which co-finances ICEX's INTEGRA Programme. This programme puts large and small companies in contact with one another, contributing to integral solutions that help make bids more competitive. In this way it helps increase and consolidate the presence of these small and medium size enterprises in foreign markets, by making use of the great international recognition that the large companies have, especially in the sectors of infrastructure, energy, communications, transport, etc., Apart from being recognized global benchmarks for their competitiveness, the large companies also serve as a tool for promoting the image of the country and opening up the market for the other companies.

Finally, Law 2/2014 on Action and the Foreign Service, has made the promotion of Spain's economic interests abroad one of the priority objectives of the country's international policy. Diplomatic work is focused on supporting the internationalization of the Spanish economy in a way that the Foreign Service reinforces the services it gives to Spanish companies.

Currently, work is going ahead on promoting Spain as a location for the offices of multinational companies, through Invest in Spain. In 2014 a Plan to attract offices and investment to Spain was introduced, with the objective of identifying and attracting Latin American companies. Spain offers the best conditions for Latin American companies and their partners to set up access platforms to the markets of the European Union, North Africa and the Middle East.

In regard to defending the interests of Spanish companies abroad, a commercial diplomacy is being developed to give support to our exporting companies. This will look at ensuring there are no non tax barriers to exports and that the commercial relationship is asymmetric. Trade agreements are being promoted that avoid protectionist measures, as well as measures to prevent dumping by less demanding countries. Special attention is being paid to customs controls and the monitoring of products on the market, to ensure that our manufacturers do not face unfair com-

petition in the domestic market from imported products that do not meet European norms.

Among the most significant actions carried out in recent times was the approval of Law 2/2014, on Action and the Foreign Service, and its Strategic Plan for the Internationalization of the Spanish Economy. Approved by the Cabinet in February 2014, it is a biennial one and falls within the framework of the Inter-ministerial Support Group for the Internationalization of Spanish Companies.

Then there is the Plan for the Internationalization of Industrial Sectors which supports the expansion of industry in foreign markets as a generator of qualified jobs. It is aimed at reinforcing various lines of action to widen the export base and to facilitate industry's access to new markets.

The action points for the Plan are to strengthen ICEX's foreign promotions and to develop the presence of Spanish industry in foreign markets (through international trade fairs, technical seminars, etc). The signing of collaboration agreements between ICEX, CERSA and ENISA will facilitate the access of companies to working abroad, as well as to financing through lines of technical and financial guarantees and participative loans. They will also prioritize the most feasible industrial projects as part of MINETUR's Programme for Industrial Competitiveness and Support for Reconversion of Industry.

On top of this, the Secretary of State for Trade is supporting multilateral negotiations at the World Trade Organization (WTO) to advance global trade liberalization. Also, bilateral trade agreements have been promoted between the European Union and third countries to open up markets more quickly and deeply. Including those still being negotiated are accords with the USA, Japan, MERCOSUR, ASEAN and China. New tools have been set up, among them documents and bonds of internationalization, new finance lines from the Institute of Official Credit (ICO) for Spanish companies to export, and the credit lines set up under the Company Internationalization Fund (FIEM).

The Secretary of State for Trade has created the portal www.barreras-comerciales.es through which companies can report on problems with their export operations and the supply of raw materials. This will enable the government to provide help in resolving the issues.

Within the framework of the multilateral talks at the WTO, the Bali Package agreed in December 2013 stands out. It includes an Agreement on the Facilitation of Trade that will simplify customs formalities among all members of the WTO, reducing uncertainties about the procedures and cutting costs and waiting times. On a multilateral level, negotiations are also pushing ahead on broadening the scope of the Agreement on Infor-

mation Technology, the aim of which is to cut tariffs on and to eliminate non tariff barriers for this type of product.

In the last three years new trade accords have come into operation with South Korea, Central America, Colombia and Peru, and more are expected soon with Canada, Singapore and Ecuador. All these agreements help add to the already extensive map of existing commercial agreements.

The digitalization of the industry or industry 4.0

As economic history has shown over the last two centuries, western countries have been through three industrial revolutions.

The first improved efficiency through the use of water power, the increasing use of steam, and the development of machine tools. Industry and agriculture was mechanized, manufacturing systems developed, and transport and communications developed at a breakneck rate.

The second started in the middle of the 19th Century and saw steam replaced by electricity and derivatives of petroleum as sources of energy, the substitution of iron by steel in industry and mass production in the form of assembly lines.

The third industrial revolution started at the end of the Second World War, mid way through the 20th Century, accelerating automation through the use of electronics and information technology. It was characterized by micro-electronics, highly advanced technologies and sectors focused mainly on R&D. Machines not only took over part of the work previously done by humans but also part of their «intellectual» work.

Our generation's turn is to live to the full the fourth industrial revolution, exalting the idea of an exponential increase in digitalization and coordination in all productive units of the economy. Without any sort of resistance, physical objects are being integrated into information networks. The Internet is at the centre of the system, combining the production of systems and processes with ever more intelligent machines to create a gigantic information system.

The term «Industry 4.0» was used by the German government to describe the intelligent factory, a vision of computer-based manufacturing in which all the processes are inter-connected by the Internet of Things.

According to Roland Berger Strategy Consultants in their report, «Industry 4.0: The new industrial revolution. How Europe will succeed», the new panorama facing European industry and, therefore, Spain's as well, will be made up of cyber-physical systems. There technology will connect all the sub-systems and processes to objects, both internal and external, to

the supplier and to networks of customers, and can be operated in real time.

Information is often seen as the raw material of the 21st Century. The quantity of information available to companies is expected to double every 1.2 years. Innovative methods to manage big data and make use of the potential of cloud computing will create new ways of leveraging information. Cyber-security will constitute a crucial element of competitiveness.

While at the start of the 21st Century connectivity was only a characteristic of the digital world, in industry 4.0 the digital and real worlds are linked. Machines, bits of work, systems and human beings will constantly exchange digital information via Internet protocols. Even the product can communicate when it is produced in a way that has come to be known as the «internet of things».

We are facing up to a virtual industrialization. At the moment the opening of a new factory, a new production process or the launch of a new product in an existing plant demands not only a big investment but also hours of adaptation and tests that require highly qualified personnel and many unexpected extra costs. A day lost when production stops signifies an enormous economic loss for many companies. Industry 4.0 will use virtual industrialization, plants and products that allow preparation for the physical production. Each process will be simulated first and verified virtually. Virtual factories will be designed and visualized simply in 3D.

What will be needed to start up Industry 4.0 in Spain? It would require the convergence of four factors:

The first will be the need to accelerate innovation, stepping up investment in R&D and innovation by both public and private sectors. New business models will be created with new opportunities for added value. But it will depend greatly on the capacity of the system to bring this innovation to the market for the real transfer of technology to companies.

The second factor is the development of large companies at European level. At the moment there are many European companies that are very well positioned as leaders in various areas linked with industry 4.0. However, there is no doubt there will be many mergers and acquisitions, including of companies that would appear unthinkable at present. I share the point made by Roland Berger in its report where the consultancy states that we will need more pragmatism in anti-trust policies. European companies must gain more competitive positions when compared with those of the USA and the Asian ones. We must let players emerge that are strong and consolidated and based on a robust European market.

The third factor necessary for starting up industry 4.0 is the establishment of a dynamic digital environment in a competitive framework that supports the development of potent telecommunications and the inter-

net. Digital development is crucial for the development of these products and services. Suppliers of infrastructure can contribute not only by providing the most efficient infrastructure, but also by developing standards for data transfer and security procedures, basically for cyber-security, telecommunications and the cloud.

Lastly, and more obliquely, for putting Industry 4.0 into action it will be necessary to develop service infrastructures in strategic areas such as energy, transport and finance.

And faced with such a revolution, how should we look at it, as a threat to our companies and industries or as an opportunity? Well, to put it simply, it is both of them, because the industry that does not know how to adapt to this new concept and demands from the market will simply not be able to survive. Industry 4.0 will change the way of doing business for industry and for the suppliers of infrastructure and technology, but it will also open up a new world of opportunities and of new business models.

What role should the public sector play in this new era? Simply to prioritize and coordinate industrial policy, setting up the framework for action, designing a strategy and leading the rapid positioning of Spain and our industry. The moment to take a step forward and make the most of it is now.

Conclusions

Spanish industry faces a series of major challenges. But as we have seen, it is performing a transcendental role in the development of our economy and the increase in the well being of the citizens and in generating jobs. It is necessary, therefore, to set up a favourable framework for improving its competitiveness. This is the role that Industrial Policy must play, through support for innovation and promoting investment in infrastructure; committing to sustainable development, ensuring energy at competitive prices... and coordinating other policies that are not purely industrial, such as labour policy, education, fiscal, environmental, etc. In this way to guarantee synergies between all of them and to make a firm bid on behalf of industry.

The industrial sector can and must play a key role in the process of economic recovery in Spain. It has room to manoeuvre, to become over the next few years one of the engines of our economy, providing solutions to the main challenges that face our country.

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Industrial policy for defence

Juan Manuel García Montaño

Chapter three

Abstract

An innovative and competitive Defence Industry represents an essential capability for our armed forces, so the industrial and technological defence core, from an operational point of view, should be considered a strategic capability.

In addition, a national industry, in the lead, efficient and competitive, supports and reinforces the principles of «freedom of action», «operating leverage» and «security of supply», all aspects closely linked to the concept of sovereignty, hence its sustainability demands an adequate industrial policy framework both nationally and internationally.

In recent years, the Ministry of Defence and in particular the General Directorate of Armament and Material have been undertaking many activities related to strengthening and supporting the Spanish defence industry.

The immediate future is to consolidate and strengthen its work with the implementation of other measures to strengthen the industry as a rather intangible vector of national defence.

KeyWords

Defence industry, industrial base, capabilities, weapons, programs.

Fundamentals of a specific industrial policy for Defence

The Secretariat of State for Defence is the body responsible for armament and materiel policy, the one which frames the industrial policy for defence. Its priority is to equip our Armed Forces with the necessary means and capabilities to carry out missions that are entrusted to them. Therefore, this policy has to satisfy the objectives of priority military capabilities set by the Supreme Chief of Staff. He keeps watch over obtaining the opportune levels of access to the means he demands, to guaranteeing freedom of action in their use, and independence in keeping them in operational condition. That is to say, in their maintenance and modernization during their service life.

An innovative and competitive defence industry represents an essential capability for complying with the mandate given to our Armed Forces under the Spanish Constitution. That is namely to: «guarantee the sovereignty and independence of Spain and to defend its territorial integrity and its own constitutional order». For that reason, the relevance of an industrial and technological basis for defence is obvious. That is why the industrial and technological basis of defence, from an operational point of view, can be seen as a further strategic capability for the Armed Forces, given that the capabilities of our companies depend greatly on the features and the quality of the armament and materiel that our Forces receive, along with the provision of services.

Sovereignty in the field of defence industrial policy

The supply of goods and services by national industry supports and also reinforces the principles of «freedom of action», «operational leverage» and «security of supply», all of which are linked to the concept of «sovereignty». They allow the forces to carry out missions autonomously, without the need to seek the approval of third countries, using a certain resource or technology of the highest level.

A state of the art industrial base that is efficient and competitive responds to the previous principles and generates as a result the industrial capabilities and areas of knowledge that are key in developing the military capabilities regarded as essential for our Armed Forces.

The exercising of national sovereignty, however, should be seen as a case of positive thinking, responding to the «principle of reality». That is, the consideration and adaptation of reality to a financial and industrial environment that conditions, among other factors, Spanish defence policy.

All strategies and policies that are aimed at the consolidation of the industrial sector of defence as another strategic capability for our Armed Forces should focus on terms of financial viability and sustainability. They

should keep away from any temptation to try and guarantee national sovereignty through the acquisition of a range of industrial capacities, incompatible to obtain and sustain with the state's budget.

The national and European defence industrial policy framework

However, the impact of an industrial policy for defence should not be limited solely to the operational field. It also has a notable relevance at both economic and social levels as a source of employment, wealth and high added value knowledge. When it comes to establishing an industrial policy for defence, what has to be taken into account, as well as the needs of the Armed Forces, is the search for and development and empowerment of the industrial and technological fabric of the country. At the same time it should be coherent with industrial policy at national and European levels and contribute as much to achieving national goals as European ones in a sustainable way.

The strategy followed until only a few years ago with regard to industrial policy for defence was supported by three basic pillars:

- Prioritizing acquisitions of armament and materiel in the national market.
- Multinational collaboration in those cases in which the technical or economic complexity of the systems rendered them impossible to acquire from an exclusively national point of view. In these cases, the principle of «fair returns» was applied, the national industry winning activity in proportion to the country's weight as a financial partner in each programme.
- Direct purchases from abroad, obtaining the maximum industrial and technological returns via compensations. In the case of there being no national capacity to develop the necessary systems, there was no opportunity to participate in international cooperation programmes.

However, the strategy which enabled the Spanish defence industry to develop over the decades between 1980 and 2010 – what might be called a protectionist one – is no longer applicable today in the new European setting. This is ever more demanding and prevents any type of protectionism that goes against the principles of free competition and a free market.

But European influence is not the only motor of change in national industrial policy. It is a fact that the government's investment efforts have not met the results expected of them. That has been seen clearly during these last few years of crisis and budgetary restrictions, in which some inefficiencies in the system have been harshly demonstrated.

The experience acquired by the Ministry of Defence during this investment period has enabled it to learn some lessons and to apply a series of measures that should serve as the basis for designing a strategic scenario for the future.

Relevant actions in the period 2011-2015

Reconduction of armament programs

The Ministry of Defence – or to be more specific the Directorate General of Armament and Materiel – has been carrying out various activities linked to support for the Spanish defence industry that have resulted in improvements to competitiveness and access to the supply chains of both national and international markets.

Perhaps the most important ones during this period were those of a regulatory nature and which have impacted directly on the basic structure of the Ministry of Defence (MINISDEF) and the competencies of the Directorate General of Armament and Materiel (DGAM), as the main negotiator with the defence industry. We are referring specifically to Resolution 320/03967/2014, from the Secretary of State, with which it was agreed to centralize certain armament and materiel programmes and their programme offices in DGAM. Also Royal Decree 524/2014, which updated the Royal Decree 454/2012, dealing with the development of the basic organic structure of the Ministry of Defence, which is largely based on the following objectives:

- Encouraging the integral tracking of acquisition programmes, reinforcing the management of programme offices and moving towards centralization and specialization in management, as well as economic and contract tracking.
- Concentrate planning and control of R&D policy.
- Supporting activity of the industry overseas and facilitating access to new markets.
- Centralizing the main competencies needed for developing an industrial policy for defence.

Specifically, to promote the management capability of DGAM, the Department increased coordination and the tracking of acquisitions, which without doubt resulted in a more efficient execution of acquisition programmes.

The new model and regulatory framework supporting it clearly differentiate the spheres of action of each of the services and those responsible for acquisitions in such a way that the former take on the role of client-user. They demand the arms systems they need to carry out their missions while the latter have the role of provider, equipping the bar-

racks with the materiel that has been asked for, of the quality called for and in the set time frames, all this in keeping with the Department's financial capabilities.

As for industry, the configuration of the DGAM, which is the only department involved in the management of programmes and acquisitions of the different weapons systems, strengthens the build up of the sought-after strategic relationship with the supplier base. It carries out actions for the Ministry, in its twin role of client and regulator that, on the one hand lead to better efficiency and competitiveness in the companies and on the other favour the necessary alignment of these with the strategic interests of defence.

Another aspect to highlight in this period is guaranteeing the viability of the main armament and materiel programmes. The difficult budgetary situation that the Ministry of Defence has been faced with since 2008 and the enormous bill on the principal programmes that is being dragged along were what led mainly to the lack of funds at the Department to meet the payment commitments to industry.

This situation presented an obvious risk, both for the viability of these programmes and sustaining them in the future, and for the survival of industrial and technological capabilities which were being generated and consolidated.

All this demonstrated the need to carry out urgent measures, which led to the approval of a plan for rebuilding and adjusting the scope of the main programmes and its approval by the Cabinet in August 2013.

This action plan, agreed with the companies, was intended to create the least possible impact, both operationally and for industry. Its aim was to reprogramme the orders for the principal systems in such a way that it extended the Ministry's payment period and adapted the orders to the new economic scenario. This meant a reduction in the initial requests for new materiel.

The efforts that were made have led to the opening of a new financial scenario at the heart of the Ministry, which should in the end favour the launch of new programmes, to the benefit of domestic suppliers.

Another consequence of the economic crisis and the budgetary restrictions in the country has been to push Spanish companies into diversifying their business strategies towards foreign markets. Since the Minister of Defence's first appearance before the Congress Defence Commission to outline his policy, and conscious of the change in tendency indicated, he made it very clear that he intended to support the industry and its internationalization.

Government to government contracts, one of the first priorities, were pushed forward with the publication of the Ministerial Order

DEF/503/2015, which set out the regulations for the Royal Decree 33/2014. This built on Law 12/2012 with Urgent Measures to Liberalize Trade and Certain Services, establishing the norms for contracts between the Spanish government and foreign governments.

The commitment of the DGAM with the industry's internationalization has made it clear that with the effort made by the Office of Foreign Support (OFICAEX), since the publication of Instruction 25/2013 from the Secretary of State for Defence, the Spanish defence industry is achieving an effective and efficient response in its need for institutional support, facilitating the process of internationalization and export efforts.

But there is also a need to keep pushing all types of activities that imply active institutional participation in the different cooperation forums and permit them to keep supporting Spanish companies in international bidding processes, and above all to facilitate industry's participation in international cooperation programmes.

In July 2014 the Cabinet approved the Agenda for Strengthening the Industrial Sector in Spain. This document presents an integrated action plan with a group of proposals, specific and with clear demarcation, from various Ministry departments and public bodies. It calls for an improvement in the transversal conditions under which Spanish industry operates, to contribute to its growth and competitiveness and increase its weighting in the Gross Domestic Product.

One of the actions contemplated in this Agenda is a new investment cycle in military R&D, adapted to military and strategic defence industry capabilities.

This new investment cycle is tied in with the financing of technological programmes connected with the future acquisition of new weapons systems, the F-110 frigate and the 8x8 wheeled fighting vehicle, two combat platforms that to comply with the technical specifications demanded will involve 19 technological projects regarded as being of high strategic value.

It is hoped that the F-110 frigate and the 8x8 armoured vehicle will have a «tractor» effect on the industrial base, contributing to pumping in new energy and pushing for a new industrial model in which a more efficient and innovative performance prevails among the companies involved.

Strategic industrial capabilities

The Ministry of Defence, through the Directorate General of Armament and Materiel, has been working on updating its knowledge of the capabilities offered by the domestic industry in defence and on identifying which of these capabilities can be classified as strategic from a geostrategical

and national security point of view, or for their doubtless economic and industrial value.

In its efforts, the Directorate General of Armament and Materiel is accompanied by the General Secretariat for Industry and the Secretary of State for Science and Innovation, those responsible for industrial and technological policies.

The identification of strategic industrial capabilities and their connections with priority technological areas for defence will enable them to orientate all their efforts, including those in R&D, towards specialization of our industry in niche markets that are clearly of interest to defence, but also to making it more competitive and with real chances of selling on the international market.

This action from the Ministry of Defence translates into support for a very relevant sector from the economic point of view, a generator of qualified jobs and with a great innovative capacity. Moreover, it will help industry take a more active part in the building up of a security and defence sector in Europe, one that is more competitive and efficient.

From the industry side, knowing the capabilities that the Ministry of Defence considers to be strategic is key to the appropriate orientation of its research, its investments and its efforts in general. It means having no doubts about what activities are really strategic for the Ministry and are therefore likely to be the target of specific policies. This differentiates them from other areas, and facilitates the ordering of goods and services by the Ministry of Defence.

The Cabinet approved on 29th May an agreement for determining the industrial capabilities and knowledge areas that affect the essential interests of defence and national security. This includes the necessary principles and circumstances for identifying an industrial capability or knowledge area.

«Knowledge areas applicable to land, sea, air and space are the following:

- Command and control, communications, information.
- Cyberdefence.
- Surveillance, reconnaissance, intelligence and target acquisition (ISTAR).
- Traffic control and navigational aids.
- Critical systems embarked on platforms.
- Space Systems, for data handling and missions.
- Simulation for equipment and arms systems for advanced training.
- Navigational systems, guide control and payload on missiles and complex munitions.

- Complex integrated systems for other advanced arms systems where integration requisites are linked to the essential interests of defence and security».

The document also brings together the «essential aspects» of a capability or specific knowledge area that «must be protected¹».

Once the knowledge areas and strategic industrial capabilities that must be preserved nationally are determined, it then turns towards industry to acquire them or push for them in the short to medium term. This will create the conditions for the desired alignment of companies with the industrial interests of defence and encourage their sustainability and competitiveness. This definition of strategic industrial capabilities will allow the government to invoke Article 346 of the Treaty on the Functioning of the European Union (TFEU) to protect those parts that are linked to essential interests for national sovereignty.

In this sense, they are working on drawing up an Industrial Defence Strategy that is targeted at setting up, within the framework of armament and materiel policy, the action points and necessary tools for developing the industrial and technological base connected with defence. This covers those capabilities considered to be strategic and guarantees the supply of armament and materiel that our Armed Forces need or will need in the medium to long term, over a time frame of 10 years.

Cooperation and industrial management

In Spain, agreements on industrial cooperation connected to defence acquisitions have traditionally been oriented towards increasing the capacities of the national defence industry. In this way they have promoted joint production of arms systems, the production of systems under license and accords, the integration of Spanish sub-systems in other systems that have been acquired, the manufacture of parts, assembly, integration and final tests and the capacity for providing the necessary logistical support through their life cycles.

This industrial cooperation implies, in most cases, a transfer of technology and know how to national industry that enables it to carry out the listed activities.

From the start of the model followed by Spain, the nature of the industrial returns has changed in line with the increase in capabilities of our defence industry. Initially it involved facilitating the production of parts in Spain for acquired systems, final assembly of these and training for carrying out maintenance.

¹ Secretary of State for Communication. Reference: Cabinet 29 May.

But for some years now there has been a big turn and we can now talk of a real industrial cooperation between foreign and Spanish companies. The returns, along with the major effort made by the national industry, means that it is now capable in many cases of carrying out the role of lead contractor for the supply of complex arms systems, of developing its own arms systems and of integrating components and systems. This scenario has even enabled Spanish companies to join co-operation programmes with other countries to develop and acquire complex arms systems. Through these, Spanish industry has become responsible for the development and production of both parts of and complete sub-systems.

The approval of the European Union's Directive 2009/81/CE and its adaptation in national legislation, Law 24/2011, as well as directives from the European Defence Agency (EDA) to limit the application of industrial cooperation solely to the cover of Article 346 of the Treaty for the Functioning of the European Union (TFUE), brought about a redefining of the strategy of industrial cooperation in Spain. This focuses mainly on strategic technological and industrial capabilities, encouraging the obtaining and/or empowerment of these, and with the revision of current industrial cooperation processes to improving efficiency and optimizing their integration with the processes of planning and obtaining resource materials.

One of the keys of these industrial cooperation accords is getting ones hands on technology. Special emphasis needs to be given here to the controls that have to be put on technology transfers to preserve national strategic capabilities. For this reason it is necessary to set up strategies to follow, as well as carrying out controls of the technology received and, as a priority, controls over its possible transfer to third parties.

As an example of this, there is increasing sensitivity in the heart of EDA and the European Commission towards establishing control mechanisms for the transfer of technology and industrial capabilities that defence companies are carrying out with third parties. In particular, they want to avoid asset stripping of Europe's technological and industrial base which gives the advantage to new competitors in emerging markets.

As MINISDEF shares this same worry, the DGAM has begun a series of preliminary analyses aimed at determining controls over the transfer of defence technology and of finding ways to make them more effective.

In the SME area, a measure has been adopted that it is hoped will have favourable returns for them. The creating of a Code of Conduct for Contractors and Sub-contractors of Armaments and Materiel is aimed at promoting transparency and equality, basically for smaller companies, in the defence market.

This voluntary Code of Conduct was published in the Bulletin of Defence (BOD) in July 2011 and became operative at the start of 2012.

Among the effects we expect it to have over the medium and long term are:

- Maximizing business opportunities for SMEs.
- Stimulating competitiveness and good practice in the sector.
- Reducing entry barriers in the defence sector.
- Fomenting mutual knowledge and synergies between companies.
- Sharing the risks and the benefits throughout the supply chain.

The publication of the Code of Conduct was reinforced with disciplinary measures from the Law on Contracts in the Public Sector in the areas of defence and security, in compliance with the adapting of the European Directive 81/2009 to Spanish law, which meant that the main stipulations in the Code of Conduct became obligatory.

In the case of the Code's application not producing the expected results, the Ministry of Defence will evaluate whether it should also become obligatory in those areas that are not covered by the law. At the least, that subscribing to the Code will be a criterion in evaluating offers, so that preference will be given to prime contractors who support equality of relations between companies in the supply chain. The Ministry would also be looking at the need to carry out audits to see it is complied with.

Future actions

Given the clear importance that the defence industry gives to having a policy on armament and materiel, and its obvious industrial links with national defence, the Ministry of Defence has been working on a new industrial policy that permits the modernization of the Armed Forces and protects the industry.

The formulating of this new model involves making use of the work carried out on measures that have already been adopted - the centralization of programmes, identification of strategic industrial capabilities and institutional support, to mention just a few of the most important ones - and support them with the implementation of other action points being followed up. Main objectives are the construction of an adequate and stable financial framework; the drawing up of an R&D and innovation plan linked to defence; promoting the competitiveness of companies, especially SMEs; the improvement of inter-action between government and industry; and the strengthening and consolidation of the industrial sector - a whole gamut of actions aimed at boosting the industry as an intangible asset in national defence.

Financial framework

The Special Armament Programmes (known as PEAs) have a common characteristic that distinguishes them from the rest of the acquisition

programmes: their pre-financing system through the former Ministry of Industry, Tourism and Trade, now the Ministry of Industry, Energy and Tourism.

What has to be highlighted with the PEAs is their complexity and technological impact, their operational repercussions and the long periods in defining and executing them, and the large amount of financial resources involved.

The PEAs have made a decisive contribution to the modernization and the professionalization of the Armed Forces. Thanks to the efforts made in the process of acquiring them, Spain has been able to generate industrial and technological capabilities that it previously lacked. These have contributed notably to providing greater operability on the part of the Armed Forces and to the greater competitiveness of companies in exporting the systems that our industry develops.

The finance model for the PEAs, which started to be applied in 1996, responded to the economic restrictions existing at that time. Four main stakeholders were involved in the model: the lead contractor, MINISDEF, the Ministry of Industry, Energy and Tourism (MINETUR, the former MITYC) and the Ministry of Economy and Competitiveness (MINECO, formerly the Ministry of Economy and Treasury). The acquisition process was linked to a system of long term financing.

The programmes currently in progress have suffered some major changes in recent years as regards the financial ceilings that were approved initially.

The immediate causes of these changes can be found mainly in initial budgetary estimates that were insufficient, either through lack of precision or for not taking into account the total costs involved in the acquisition programmes. These included important items associated with revisions in prices, modifications in contracts, or the effect of items where the amounts remained open on the signing of contracts because of the uncertainty of fixing a price at that time. (Prices traditionally deviate upwards from the original costs estimated in programme budgets).

It is also necessary to think about how the systems that are acquired through these programmes have financial implications way beyond the paying of the costs of acquisition. The systems are bought to be operated and supported, and their operation and sustenance bring with them added budgetary necessities.

The scenario imposed by the budgetary restrictions, as well as the complexity and the high cost of the systems, means that the support for activities linked to sustaining them takes on particular importance. What is needed is a change in culture in Spain where the industrial component

of defence activities has traditionally been valued much more than the services connected with the equipment.

The maintaining of systems clearly has a strategic component of its own and that is in increasing the availability of material resources. If, in addition, those support services are provided by national industry, the freedom of action and supply is increased, which raises the strategic importance of the question.

These support activities can clearly be innovative, when they seek to maintain or increase the technological capabilities of the system, an area in which SME type companies, with their flexibility, availability and innovative nature, can offer high value solutions.

Industrial support in the life cycle also generates an economic value, both for the government – with regard to the savings made on prolonging the life of the systems – as well as the companies themselves, who see in them an attractive line of business in the current times of low demand for new equipment and limited resources.

This is why the financial implications of the life cycle of the systems acquired need to be considered when it comes to determining the viability of an investment. They should be evaluated as rigorously as possible.

Under the umbrella of what was established in Instruction 67/2011 from SEDEF, which regulates the process of acquiring materiel resources, the Ministry of Defence has established mechanisms for determining the overall economic viability of acquisition projects, based on realistic budgetary forecasts of all phases of the life cycles of the systems that are acquired.

The Ministry of Defence is committed in its efforts and the quality of economic forecasts on programmes in the viability phases, and this leads to increasing efficiency in the use of the financial resources available.

The length of the period of budgetary restraints suffered by the Ministry of Defence over recent years as a result of the global financial crisis which started in 2008, coupled with the large amount of payment commitments that came with the Special Programmes acquisitions, has had palpable effects on the economic viability of these commitments. It was also clearly demonstrated, among other inefficiencies, that the economic component of contract processes was not being given sufficient consideration, making it necessary to adopt a combination of on the spot and structural measures that implied a change in the model of how the Department's needs are financed.

The new model should have the goal of resolving the problems in the current system and creating a favourable environment for carrying out a future investment cycle. A global medium to long term solution is needed

that incorporates a diverse spread of measures. The solution to the problem will necessarily involve measures to adjust and optimize costs and to promoting structural measures that increase efficiency, both in the management carried out by MINISDEF and by industry. As national industry is directly affected, there must be commitment and collaboration on its part on the possible solutions that are put forward.

The immediate measures to be taken have to allow them to face up to the still delicate budgetary situation and will include spending adjustments on unavoidable necessities and the optimization of available financial resources that are already committed. As part of these measures, and has already been mentioned, the Ministry of Defence has begun (as has happened in other countries) to modify some of the current contracts, checking that there is a minimum impact both on operations and industry. At the same time they have put forward a specific handling process for the return of financing through the Ministry of Industry in instalments that are more realistic and in accordance with the prevailing budgetary context.

The inescapable principle of fomenting the maximum efficiency possible in the use of public resources, especially within the difficult economic-financial context that still conditions us, imposes the need to keep a tight track of the economic changes with the main programmes, in such a way that we can anticipate or detect early budgetary deviations that could require corrective measures.

To attend to this, as has been pointed out already in the part about relevant activities carried out between 2011 and 2015, the Secretary of State for Defence has approved moves to centralize management and contracting of programmes for the acquisition of armament and materiel, for modernization and common maintenance, and their programme offices in DGAM. This measure is in keeping with the bid to introduce a centralized model of organization for managing and contracting the programmes.

In this respect, the Ministry will continue with its activities aimed at the effective configuration of the DGAM as the single office for the managing and contracting of acquisition programmes, in a way that will guarantee a better and continual monitoring of the contracts and alert us of any economic changes that could be produced.

However, getting out of the still difficult financial situation that the Ministry of Defence is going through will not be possible only through adjustment measures.

Possibilities of adjustment are limited due to operative, programming and other reasons. That is why the adjustment measures need to be accompanied by a reasonable increase in the area of investment in the Ministry of Defence budget, with the goal of guaranteeing the viability and finan-

cial sustainability of the most basic needs connected with the acquisition of armament and materiel.

Although these limitations were overcome in the short term, the Ministry of Defence is thinking about a reasonable and sustainable increase in the investment part of its budget, one that will permit in the medium term levels of budget that are comparable, in terms of GDP, with other European countries.

In this way, it will keep asking for financing from the Ministry of Industry and the Ministry of Economy and Competitiveness for activities linked with the different mechanisms that have been established with them, focusing as far as it is viable on specific payments dedicated exclusively to the defence industry.

Parallel to this, it will push ahead with finance mechanisms that share risks between the Ministry of Defence and industry in the development of new systems. In particular, in establishing mechanisms for a cost return on the development of programmes financed by the Ministry of Defence and where opportunities for exports arise, given that a properly formalized one will permit the launching of new programmes.

The solution to the lack of stability and foresight that has historically characterized investment in defence will have to be supported by adequate and sufficient regulatory mechanisms. That is why, with the goal of guaranteeing a reasonable and sustainable increase in the defence budget - in as much as the framework of the overall national budget allows - it should not be one that depends on the moment but one that ensures the viability of ongoing projects and the launch of new investments. The Ministry of Defence should look at the possibility of pushing for the defining of and putting in practice of a mechanism for stabilizing defence budgets. This should have legal status and be justified by the specificities and implications of defence and its associated industry.

This financial system for defence investments already exists in countries around us. Such is the case in France where the regulatory framework ensures that acquisitions of materiel and services for the Armed Forces are not subject to momentary ups and downs. However, they do clearly have to be subject to the maximum levels of transparency and parliamentary control.

Such a regulatory framework should include a specific procedure for parliamentary approval for related investments, with the objective of making sure there are sufficient guarantees for funding. To ensure the continuity of programmes, their approval should be in line with the same procedures and status as the budget legislation and include a commitment mechanism.

In the same way, the stabilizing solution for budgets that is established should set a limit on the maximum period of the budgetary commitments and a procedure for keeping parliament informed about how it is being executed, with full details of any changes that may occur, what has caused them and what has been done about them.

As well as this series of immediate and structural measures that has been listed so far, it will also be necessary to delve more deeply into measures that enable the Ministry of Defence to procure this extra income and that alleviate, to a certain extent, the pressures that the ordinary budget faces. Among the various ways that the Ministry of Defence can generate extra income are: public-private collaboration on joint exploitation with defence companies of infrastructure and equipment available at military installations (test equipment and facilities, workshops, simulators...), the expropriation of surplus material, the exploitation of immaterial goods (intellectual property rights derived from R&D programmes and from acquisitions financed by the Ministry of Defence itself) and through the hire of technical services.

The efficient management of industrial and real estate assets connected with production, as well as the manufacturing processes, patents and technologies obtained from Ministry of Defence investment programmes, should be available to the Ministry itself, although their use and exploitation is ceded to others. In this way, the Ministry of Defence can give priority to identifying strategic assets in the possession of companies that are generated by each acquisition programme or that have been obtained through the Ministry of Defence's own investments. The aim is to draw up actions for their conservation and use and eventually getting returns on them.

The Ministry of Defence will develop mechanisms for getting returns from the export of systems derived from developments financed by the Ministry itself - possibly ones that have never been exploited, in spite of this being included in the contracts - that will be reinvested in new programmes of innovation.

In the same way, the Ministry of Defence will continue working on identifying materiel that can be considered as surplus, abandoning the traditional policy of withdrawing from use systems when they have already lost all their value, in favour of a possible expropriation, and involving the national industry in modernization programmes linked with the sale and later maintenance programmes for the countries that acquire them.

The Ministry will also establish a system for hiring services, demanded by national industry, (for example, for trials, for certifications, cataloguing, ratification and ensuring quality...), for both national programmes and export contracts for the national industry. This will guarantee later reinvestment in programmes of innovation, acquisitions and services.

R & D and innovation associated with defence

The importance of R&D and innovation, essential for maintaining the technological superiority of arms systems and the competitiveness of the companies that supply them, is a requirement that cannot be overlooked.

With regard to the Ministry of Defence, R&D and innovation effort is conducted along two main lines. The first consists in the development of prototypes as part of a preliminary phase in the process of obtaining the complex weapons needed by the Armed Forces. Then there is the broadening of knowledge and the acquisition of knowledge that can be applied to future weapons and equipment systems, as well as their verification via technological demonstrations (technological research activities, or R&T).

During the last few years an effort has been made to set out a strategic guideline for stakeholders linked to technology development, such as universities, research centres and companies, enabling them to focus on the broad range of technologies that apply to defence.

Specifically, it is worth highlighting the publication in 2010 of the Strategy on Technology and Innovation for Defence (ETID - 2010).

More recently, as another example of the bid to promote R&T in defence and its commitment towards companies that operate in the sector, the Ministry of Defence has stated its intention to start a new investment cycle in military R&T that is adapted to military capabilities and strategic industrial capabilities in defence.

As with the categorizing of the strategic industrial capabilities, the ETID is the reference point for deciding on the industrial aspects in the process of obtaining armaments and materiel. The technological goals should orient R&T projects in defence, both at national and international level.

But future activities should be evaluated with a long term focus. Drawing up an empowerment plan for military R&T that is coordinated with technical goals and linked with the already mentioned strategic industrial capabilities is regarded as essential. It needs to cover aspects such as the participation of SMEs, a key collective in innovation, as well as the universities and centres of investigation in defence R&D. It is of paramount importance that there is an adequate and fluid transfer of knowledge and know how from the last two to companies to guarantee the sustainability of the industry and to support its capability to compete at international level.

The framework for action should continue to allow effort to be put into centralization and coordination, both in the programmes and in technological centres attached to defence. In this respect, progress has already been made in the last few years, motivated largely by the spending re-

restrictions brought on by the crisis, and these are already proving fruitful. The new role of the National Institute for Aerospace Technology (INTA) in unifying projects and programmes shows that the process has already begun, although there is still some way to go.

On another point, the activities in spreading the news carried out by the System of Observation and Prospective Technology (SOPT) continue, so the efforts in technological monitoring by the Ministry of Defence have a bigger impact on the national defence industry sector.

Additionally, collaboration is still being encouraged with other public bodies connected with R&D through the setting up of agreements that give rise to synergies with civilian R&D. It is without doubt an inevitable process for giving greater prominence to the field of civilian security and for the restrictions that defence R&D has specifically experienced in recent years.

The Ministry of Defence will continue to work on bringing companies in the civilian sector closer together with those in defence by pushing the Cooperation Programme on Scientific Research and the Development of Strategic Technologies, one better known as the «Coincident Programme», and through the promotion of innovative public buying (CPI). The promotion of this tool, through an increase in budget for the programme, the increase in the number of technological areas of interest and the modification of conditions on industrial property could be a way of attracting SMEs to the defence sector. In this respect, the Ministry will assess the option of introducing more instruments of this type in other areas of the department.

Looking deeper into the area of financial instruments, the Ministry of Defence will produce a catalogue of public support for innovation that will be available to companies from other bodies. These could be of the European civil type - Horizon 2020, COSME (the EU programme for the Competitiveness of Enterprises and Small and Medium-sized Enterprises) – or structural funds, and ways of facilitating access to them by companies in the defence sector are being studied.

But the impulse of innovation should not be the sole responsibility of the government. The private sector ought to increase the amount of resources it dedicates to research in new technologies. In parallel, it should also push constantly to development more efficient models and work on the continuous improvement of business processes that bring about increased productivity and competitiveness.

In this way, the use of Pre-trade Purchases could be a stimulus for promoting investment in private R&D and innovation in the defence sector, now that the public purchaser does not reserve the results exclusively for its own use but shares with companies the risks and benefits of the R&D

that is necessary to develop innovative solutions which improve on those products currently available on the market.

Additionally, the figure of Early Demand – implicit in this type of purchase – constitutes an ideal instrument for letting companies know about the products and technologies that are going to be asked for in the short to medium term.

Finally, the Ministry of Defence will continue contributing to networking days, sector meetings and seminars on specific subjects that unite technology users and suppliers and promote open innovation and the establishment of alliances.

Promoting the competitiveness of companies

At present the national defence industry is facing the challenge of being adequately prepared to deal with the scenario of change in which it is immersed. The reduction in investment levels motivated by the economic and financial crisis, plus the effects of a globalized world in which emerging countries with a big industrial drive shape a new environment, demonstrate that to keep pushing for a guarded national industry, dependent on the state as a quasi-unique client, is unviable. The government can and should join industry in this process of adaptation.

Now comes the moment to analyse the current situation for the defence industry and, above all, to know which model we should be betting on to face up to the hustle and bustle of our times in the best possible way.

Spain can count on capable companies at all stages of the value chain in the defence industry, from the integrators of complete systems – as is the case in the naval and land sectors – to Tier 1 suppliers, with real prestige at international level, mainly in the field of aerospace. Then there are the second, third and lower tiers where there are some excellent companies in technologically state of the art niche markets.

But it also happens that there are national integrators of complete systems which operate in sectors where there has still not been the necessary concentration of industrial stakeholders at European level. The supply side needs to be rationalized and the surviving products be capable of competing in better conditions in the global market.

The aeronautical market, particularly in the civil area, has shown that is possible to build trans-national industrial structures that have dominance in the market, based on the integration of suppliers of specialist sub-systems and that attain their position thanks to competitive and technological advantages and not for being mere receivers of a share out of industrial quotas. The bid for this type of business favours regional specialization, as is the case with the manufacture of plane parts from

composite materials in Spain. This eliminates the duplication of capacities among countries and the detriment that this brings in terms of the competitiveness of the resulting product.

The alternative, therefore, is quite clear. It is one of deciding whether to bid for a concentration of national industrial players, to create what is commonly known as a «national champion», whose minimum size necessitates a meaningful level of demand to maintain the necessary technological and competitive advantages. Or, on the contrary, to opt for consolidation, strengthening and concentrating suppliers of sub-systems and equipment which will be the depositories of industrial strategic capabilities and can compete but also cooperate where necessary with equivalent companies at European level. This generates true value structures that support the giant manufacturers on the continent in the provision of the products and services that the Armed Forces demand.

The capacity to integrate sub-systems in the supply chain should be a main goal for industrial policy, not only because of the strategic value in supporting military capabilities and the freedom of action in deciding what elements or sub-systems will form part of the of the arms system, but also for the technology it brings and the economic activity that is generated.

It should be considered whether the capacity to integrate and carry out national designs and developments of final or intermediate products makes it possible to export these products, empowering the political position of Spain on the international scenario and generating important economic benefits for the Spanish defence industry.

As has already been mentioned, the Spanish defence industry sector is passing through an important point of transition caused by various factors that affect both the Ministry of Defence and the national industrial fabric.

Firstly, there is the economic and financial crisis that has affected most of the western states and from which our country could not escape. This factor, one that was purely related to that moment, has directly affected the state's budget. The amount available for investment was reduced, due to the policies of austerity in spending and concrete measures to reduce the public deficit. This contraction affected all parts of the budget, resulting in a reduction in the credits assigned to the defence budget and more especially the section of investments.

On the other hand, there have been and still are structural factors in our industrial base that have aggravated the situation, such as the heavy dependency on demand from the national Ministry of Defence, caused by a limited capacity among some companies and organizations to gain access to foreign markets.

Historically, the actions of the Ministry have sometimes been too protectionist with national industry and not motivated efficiency in the companies, which in turn have not known how to take advantage of the opportunities that have been presented to them.

In this context, it is necessary to take into account national and European legislation which shows a clear and firm tendency to limit the above-mentioned protectionist actions.

The EDA has been working for a decade on strengthening the European Defence Technological and Industrial Base (EDTIB) to create a European defence equipment market that is competitive at international level.

Various initiatives have been developed by the agency in pursuit of this objective. Still current at the moment, and the most outstanding, are: the definition of the EDTIB strategy; the publication of guidelines and a plan of action for supporting the incorporation of SMEs in the defence market; the creation of a web portal for acquisitions and information on business opportunities in the defence field; the approval of an agreement on Security in Supply; the launch of various different measures to promote the creation of clusters, and facilitating the access of the defence industry to the European Union's financial instruments.

Spain has supported, supports and will frankly continue to support those EDA initiatives that have a positive impact on our Industrial and Technological Defence Base (BITDE). Proof of that has been our voluntary signing up to the main codes of conduct and good practices launched by the European agency, and the publication in 2011 of our own Code of Conduct for Contractors and Sub-Contractors of Armaments and Materiel.

The European Commission is playing an increasingly active role in the defence market with the approval of various regulatory measures that, on the basis of similar principles to those that underpin the EDA's activities, are obliging member countries to profoundly revise their materiel and services contracting policies for security and defence.

Because of all this, it is necessary to adopt measures that focus on promoting the competitiveness of the companies in the sector, in a way that reduces their dependency on state budgets. These include the promotion of excellence, continual improvement in companies, support for SMEs and the development of clusters and cooperation between them, as well as tracking and supporting initiatives that are developing at European level to push for a more competitive defence industry.

As client and regulator, the Ministry of Defence should support and provide incentives for the efforts of companies as they search for quality and continual improvement in all the parts of the value chain. This promotes an industry with higher productivity and is more competitive.

With this goal in mind, the Ministry will have to analyse the possibility of promoting the use of contracts based on loans for obtaining and maintaining materiel, introducing incentives to encourage continual improvement in the industry. With these contracts the Ministry will, in turn, get a better quality-price ratio and the commitment of the industry to comply with the goals that are written into them.

Also, with the aim of rewarding those companies that make the effort to seek this continual improvement, it should look at the introduction of possible changes in the way of evaluating offers. So that, within the limits of the Law on Contracts in the Public Sector, it could discriminate positively in favour of companies that demonstrate they have made the effort to develop efficient models and, therefore, have made improvements in the quality of their products.

Within the industrial fabric of defence, SMEs are a basic pillar due to their dynamism, adaptability and capability for innovation. They contribute distinct products and services of high strategic value at a military and industrial level. They also represent approximately two thirds of the companies operating in the Spanish defence industry sector, with a very diverse portfolio of clients and products that are characterized by a high level of civil-military duality.

The future of the SMEs lies in improving their competitiveness for accessing new markets, be they civil or international. That is why competitiveness should be a priority, both for the SMEs themselves – which should look at increasing the added value of their products and efficiency in management – and for the government, which should contribute to that improvement by influencing positively on any of the aspects that contribute to it.

It is fitting to point out that the factor that has the most effect on competitiveness is the average size of the company. This relates, in turn, with other factors such as productivity (to take advantage of economies of scale), access to credit and the possibility of financing investments in capital and in R&D. Yet, this factor is also one of the main weaknesses of Spanish SMEs in this sector.

The Ministry of Defence should consider it fundamental to support national SME supply chains and provide them with new opportunities. From the Ministry's point of view, the European Commission's insistence in promoting links between SMEs and defence is seen as positive. That is why it should contribute to the communication of and the development of joint projects between companies, and to the possibility put forward by European authorities of using structural and investment funds for supporting dual use projects.

Defence SMEs in our country face a series of problems that to a greater or lesser extent are common to all of them. The lack of tendencies towards industrial consolidation, the increase in competition in the national market as a consequence mainly of liberalizing policies that emanate from the European Commission, the power of the main contractors in the market of the main contractors and the low visibility of the SMEs are the main threats to them.

The Ministry of Defence can support the SMEs in improving their competitiveness by using some of the tools they have in their dual role as client and regulator in the defence market.

As a client, the Ministry has programmes and contracts that are instruments for defining the type of industry that best meets its interests. In this context, the Ministry can develop measures that help SMEs to get access to defence activities, especially those that contribute to supporting a critical military capability.

In its role as regulator, the Ministry of Defence can carry out a variety of regulatory initiatives that can lead to a more open, transparent and fair market.

On the margins of this role as client and regulator, the Ministry can also push for and act as a catalyst in agreements between companies, to encourage the development of joint products through meetings and coordination forums that also facilitate the spread of capabilities.

Cooperation between SMEs usually takes place through their integration in associations known as clusters. It has been demonstrated that the ones that do this show a higher ability to innovate, to create more jobs and, in short, are more competitive. The reason lies in the fact that cooperation through clusters helps the affiliated companies to minimize, if not eliminate, some of the difficulties or barriers that these smaller companies have to confront. That can be access to information, their penetration in new markets, the search for trading partners, protection of intellectual property rights and financial support, among others.

The European Union has for some time had a strategy going that supports SMEs through these clusters. There is a double objective. On one hand it helps them emerge, and on the other to promote greater cooperation between them at European level, which also helps in their internationalization.

The Ministry of Defence firmly supports the measures put forward by the European administration to aid SMEs and defence clusters, in that these provide new opportunities for national supply chains. As such they will be tracked by the Ministry, which will work on defining suitable measures for promoting the creation of a network within defence. The goal is to get

them to interchange knowledge, experiences and best practices, all in line with the European initiatives.

The dialogue between the Ministry and industry allows for mutual understanding and is essential for building up a series of common interests that can be channelled strategically through the department, to guarantee that they are in keeping with the main interests of national defence.

That is why improvement in the competitiveness of SMEs should be a goal that is shared between them and the Ministry. In the first instance this is because it will help them to compete in other markets and sectors, reducing their dependence on the domestic demands for defence. Secondly, because it will allow the Ministry to prioritize its resources towards those SMEs whose capabilities are critical for military and industrial capabilities.

Government – Industry interaction

Given the paramount importance of contacts between the Ministry of Defence and the country's industrial and technological base, it is necessary to keep pleading for dialogue between the department and companies in the sector. This promotes the mutual awareness that is needed to form a strategic relationship between the two sides.

With regard to the Spanish industrial fabric, the wealth and variety of business profiles and the intrinsic complexity of the sector makes associations of companies a fundamental part of the relationship between the administration and the companies. The companies use the associations and the professional clusters as tools for channelling their interests and initiatives through to the Department.

Meanwhile the Ministry, conscious of the importance of its relationship with the industry and business associations, has been striving to promote communications with the companies in the sector through a System of Industrial Knowledge Management (a common data base in which all the information on defence capabilities offered by national industry is stored). Other activities include seminars, the publication of documents related to the planning of resources, the editing of Notebooks on Industrial Policy and the recent updating of the organization at the DGAM to reinforce its role as the manager and sole negotiator with the industry on acquisition programmes.

But all this is not enough. The actions of the Ministry of Defence aimed at strengthening relationships with the industry need to be complemented by others, with the ultimate goal of setting up a collaborative framework that ensures coherence and coordination between the initiatives carried

out by all government bodies, both those within the national administration and those of the regional governments.

Looking closer at this area, the policy for the defence industry should incorporate as an objective the strengthening and institutionalizing of mechanisms and areas of discussion and collaboration between the Ministry, Spain's industrial and technological base, and other stakeholders involved in the economic activities of the defence industry.

All this requires a profound knowledge of the industrial fabric. To dig deeper into this knowledge and to support the industry's capabilities, an action line has been established to promote the previously mentioned System of Industrial Knowledge Management (SGCI). It is seen as a basic way of making sure that the Department's activities are based on a sure and extensive understanding of the industrial reality, that there is discussion with other public agencies and improved cooperation with associations and clusters. This will also serve to promote and provide an official channel for dialogue between the different stakeholders.

Intelligent management of knowledge of the industry and its technological base, its organization, functioning, capabilities and personnel, both nationally and internationally, is an unquestionable advantage for any buying organization, turning it into a crucial industrial interest for national defence.

This knowledge of industry should serve the Ministry of Defence well in defending its interests in both national and international spheres and in defining appropriate strategies and positions at any time in a global setting that is highly changeable and competitive. The development of this capability will, without doubt, enable the Ministry to increase its support for companies in the sector.

With this goal of expanding understanding of the industry at the core of the Ministry, it is now working on the implementation of an Integration Unit for Industrial Knowledge that will compile and integrate all the information that is available about the industry within the different areas of the Ministry.

The SGCI currently permits the integration of various modules that allow for the introduction of information, via Internet, by companies, as well as the validation and exploitation of the data by the Ministry's technical services. It also helps the companies with transmissions when dealing with bids for NATO contracts through the Declaration of Eligibility - a process that vouches for them as potential contractors - when dealing with the different buying bodies at the Alliance.

When the Integration Unit for Industrial Knowledge reaches its maximum level of operability it will have a series of functions that will enable it to carry out different types of analysis of the national industry, report on the

import – export flows of our companies, the tracking and evaluation of the performance of industrial returns, and to support decision-making on the industrial aspects involved in defence planning.

Once this capability is developed the Ministry of Defence will be able to provide the industry with the appropriate information for supporting its activity. To help in this a Defence Industry Support Portal (PAID) is planned, which will link with all the parts of the system that are accessible to the companies.

One scheduled feature is for PAID to include advertising, enabling armament and materiel contractors and sub-contractors to disclose the activities they want to sub-contract. The aim is for this publicity to have an effect on the whole supply chain and to help develop an industrial and technological fabric in which the SMEs will have a greater participation.

The goal of PAID, therefore, is to channel discussions - including those on regulations, news, public competitions, sector forums and business opportunities abroad - and to develop a chain of professional contacts for stakeholders in the sector. It will be oriented at providing a communication channel between companies, enabling them to advertise their products and services and to seek possible Partners etc.

Strengthening and consolidation of the defence industrial sector

As has already been pointed out, the broad scope of the defence industry means that the necessary competencies for its management stretch beyond those assigned exclusively to the Ministry. That is why it has been necessary to coordinate the Ministry's actions with other government departments and organisms, to avoid possible inefficiencies and duplications of initiatives. This way it ensures coherence and that they complement each other, maximizing the returns on effort.

The Cabinet, meeting in July 2014, agreed to assign the Ministry of Defence, with the collaboration of the Ministry of the Treasury and Public Administration, the Ministry of Industry, Energy and Tourism and the Ministry of Economy and Competitiveness, the responsibility for planning, directing, control and execution of the policies necessary for the strengthening and consolidation of the defence industry. This key sector for security and national sovereignty provides a differential value to the systems used by our Armed Forces in their operations, providing them with an operational advantage and the necessary capacity of persuasion.

The Ministry of Defence continues to progress with communications with other public stakeholders, identifying those that have competencies related to the technological and industrial field, both within central govern-

ment and in the regional governments, so that it can co-ordinate actions which benefit companies in the defence sector.

Meanwhile, the company associations and business clusters operating in the area of defence also have a key function in these discussions. Their principal objective, as regards an industrial strategy for defence, is the harmonization of the industry's interests.

This harmonizing role is essential for constructing a group of common interests that can be channelled towards the Ministry of Defence and aligned with the interests of national defence.

The role of go-between elevates that of the associations and clusters to more than one of purely contractual relations with companies and puts them in a privileged position for maintaining constructive and responsible dialogue with the government in general and the Ministry of Defence in particular.

With the aim of improving cooperation with the different association forums set up by the companies, the Ministry of Defence will be working on identifying industrial associations and clusters that are linked to defence and security, setting up through them a permanent dialogue with the industry for dealing with issues that are of interest to both parties.

The objective will be to set up a benchmark meeting point that aids official collaboration between the Ministry of Defence and industry, one that serves as a round table and enables exchanges and analysis of initiatives by both sides.

One of the principal tasks of this forum between Industry and the Ministry of Defence will be to identify the main problems facing the national defence industry, especially the SMEs, as well as defining the actions needed to solve them.

The industry as a vector for national defence

Defence is an intangible asset that society enjoys on a daily basis and yet it is rarely seen clearly by them. Given the existence of long periods of peace, citizens sometimes have the view that investment in defence is not really necessary.

Neither do the high prices of arms systems contribute to improving the perception of spending money on the military, especially in times of economic crisis like the one that is still affecting us.

It is, therefore, necessary for the efforts and activities that have been covered here to be complemented by others that are directed at promoting a culture of defence, both in the security sense and in the economic one.

From the security view, defence is a basic pillar of this and as such should be valued by society. The importance and the preoccupation with this objective were demonstrated by the fact that the Constitutional Law 5/2005 on National Defence includes the following: «The Ministry of Defence will promote the development of a culture of defence with the aim of Spanish society getting to know about it, to value it and to identify with the Armed Forces' history and sense of solidarity in safeguarding national interests».

On the economic front, the idea is to identify, give a value to and make people aware of the importance of the Armed Forces as being yet another stakeholder among those involved in our economy. Investments in defence generate qualified jobs, innovation, progress and wealth among citizens, and its costs are offset by the returns, direct and indirect, that it generates.

As far as this area is concerned, the Ministry of Defence needs to maintain and keep stressing its efforts in explaining to Spanish society the reasons for investing in materiel and national security, from the need to defend our essential values and interests to the economic returns, quality jobs and the increase in competitiveness for industry that it generates. To carry this out, the Ministry will promote and finance as far as possible communications activities that contribute to the defence industry getting the consideration it merits and to highlighting its importance among citizens. Examples of this are producing publications; collaboration with foundations, institutes, universities and other organisms that are interested in publishing information, and the organization of seminars and communications campaigns etc.

We trust that all these activities, both those that have already started and those scheduled, will benefit our defence industry base and especially our manufacturing fabric so that our Armed Forces can have the best arms and equipment systems possible and can contribute to the wellbeing and stability of our society.

Human capital: training

Lastly, but equally important, is to highlight that with all that has been covered so far, from the government's point of view, it will not be possible to carry this out if we cannot count on a labour force that is highly qualified and sufficiently motivated.

Within the new organizational framework, what is seen as a priority is perhaps the most important asset of all that are managed by the General Directorate of Armaments and Material: human resources.

Progressing towards professionalization of management while giving special attention to training and specialization among personnel and improving knowledge are among the most important tasks that need to be carried out.

For some time now, the Directorate General has been banking on training. Proof of this are the programme management courses that are held annually in both basic and higher formats. They are to train up programme chiefs and personnel from the Programme Offices and other related areas, to learn about the inherent complexities in the management of the programmes and to improve their efficiency when it comes to the acquisition of the valuable systems demanded by the Armed Forces.

This effort being put into training has also generated a community of networking of knowledge and experiences that is called the «Community for Armaments and Material Programmes». It also includes professionals from the defence industry and periodically gets together on subjects of interest, to spread the word and analyse aspects relevant to the world of programme managing.

Last year two new courses began in addition to these on management: the «Course on Directing Skills» and the «Course on Risk Management». Both are short length ones that aim to equip students with specific competencies in these areas.

The objective of DGAM is to keep progressing with training and in the professionalization of management, to become the benchmark at the Ministry of Defence for knowledge related with leadership, planning and development of armaments and materiel policy, as well as that related with programme management and contracting techniques.

It is worth pointing out here that in coordination with universities, the first steps are being taken to create a profile what in the future could become a Masters in Leadership and Management of Systems Acquisitions for Defence. With its different facets, this would be an excellent training opportunity for personnel, covering aspects of management, of research, contraction and other specific knowledge and specialist areas that are necessary for achieving excellence in the preparation of personnel.

This will also enable us, thanks to collaboration with the relevant university centres, to develop tools that help us retain this knowledge and to create a body that gathers, spreads details of and updates the valuable know-how that the organization needs and cannot afford the luxury of losing.

Also in the field of collaborating with institutions in the educational world, we have been maintaining contacts with the Defence Acquisitions University (DAU) in the United States to exchange information and experiences with the aim of determining how to meet specific knowledge and learning

needs. There has also been participation in the IDEAA (International Defence Educational Acquisition Arrangement) seminar, a forum that looks at the common aspects related to teaching in areas connected with policies for the acquisition of armament and materiel.

In short, the aim is to be able to count on human resources that are highly qualified and motivated as the basis for generating and projecting an authentic organization culture, one of quality and that is effective and efficient.

The globalization of defence issues: military capabilities, market and industry

Arturo Alfonso Meiriño

Chapter four

Abstract

Since the 2010's financial and economic crisis began to hit the Western countries, we have been witnessing a paradigm shift in how to manage matters relating to defence by the states. A growing and interconnected global economy is also at the heart of this paradigm shift.

Restrictions in public spending caused by states' heavy indebtedness - which in turn dragged a drastic fall in defence budgets in most countries - have brought about, in particular, a change of model in how to manage military capabilities.

This has been so, in three related areas to military capabilities: analysis and planning; the defence market; and the specific technological and industrial defence sector that will have to develop, deliver and sustain such systems in a more and more technological, competitive and global context.

No doubt, this new model linked to the increasingly international dimension within the management issues of the military capabilities is already drawing the future governance of the armament and equipment of the Ministries of Defence, including its market and its industry.

KeyWords

Military capabilities, multinational approach to military capabilities, Pooling of capabilities, Pooling & Sharing, Smart Defence, European Defence Equipment Market (EDEM), Defence technology transfers, European Defence Technological and Industrial Base (EDTIB), European Commission(EC), European Defence Agency(EDA), Internationalization/ Institutional Support for Internalization of Defence Industry.

Introduction

It is a long time ago that Adam Smith, one of the greatest exponents of classic economy, published his book, *The Wealth of Nations*. In 1776 he highlighted the need not to depend on neighbouring countries when it comes to manufacturing products for defence. Translating his words to modern times, we could say that Adam Smith pleaded as such because the industrial capabilities needed to equip the Armed Forces of a country with the military capabilities required to face up to the present and potential future threats and risks should be mainly located in national territory.

It is evident that in his day the technical complexity of today arms systems never passed through the head of the Scottish economist. Nor the costs of developing and producing them, their high maintenance costs, and of course not the existence of the supranational organizations that emerged as a result of the Second World War, such as the North Atlantic Treaty Organization (NATO) and the European Union (UE). In each of their areas of influence these organizations brought with them a new way of looking at defence issues within a framework that is much more cooperative, from the operational, economic and industrial points of view. As for the possibility of sharing military capabilities, to the point of depending on another country in using some of them, that did not form part of Smith's vision of «defence».

Perhaps this is the first point we should reflect on. At the current moment, thinking about being autonomous, without nuances, both in the procurement of military capabilities and having the industrial capacity to provide them, is an authentic illusion. And that includes not only the less prominent countries in the field of development and production of defence systems, but also the big ones, those that continue to maintain investment policies in defence R&D and development and production programmes for armaments and materiel among their priorities within the broad spectrum of governance. Of course, Spain, a country we could classify as mid range in defence issues within the European framework, is in no way an exception to this.

Defence issues, for long traditionally associated with the concept of national sovereignty, have crossed frontiers and are now discussed, ruled upon and managed at multilateral forums, impacting directly on the states' actions in this area. This includes analysis and planning of the military capabilities that have to pass through these international filters.

We are taking part in what could be called the globalization of defence issues. It is an area that goes way beyond the purely operative aspects associated with the participation of the Armed Forces in coalitions and multi-national expeditionary forces that are set up ad hoc under the umbrella of the United Nations (UNO), NATO or the European Union, to deal with the conflicts and instability that result from failed states, international

terrorism or the regional threats that western countries have had to face up in the last few years. This 'globalization' affects, as was mentioned before, on one side the planning of military capabilities that each country needs to be able to defend its national interests or to face up to its international commitments, and on the other the industries that supply them. It is this process of 'globalization' of defence issues linked with military capabilities that we are looking to analyse in this chapter.

The three dimensions of the process of development of military capabilities

The planning of military capabilities

The first dimension that has been affected by the process of globalization is, to be precise, the planning of military capabilities that the western countries continue needing to equip themselves with the necessary systems to face up to current and future threats.

It is impossible to take on alone the diversity of military capabilities that are needed today to confront the broad spectrum of threats. That is not only due to structural reasons linked with the limit on budgets assigned to defence since the end of the Cold War in Europe¹, but also to immediately relevant reasons, ones that are derived from the negative impact of the financial and economic crisis that has been affecting defence budgets in the last few years and are today a reality. Without forgetting, of course, the technological factor, one that is so closely linked to the new and sophisticated arms systems. Or the economic factor associated with the high costs of these arms systems in all their phases of production and maintenance during their life cycles which prevents even the big countries in defence from acting alone.

All this has highlighted the need to cooperate and work together on planning these capabilities, modifying inexorably the traditional concept of sovereignty that has been managed up to now. While it has not completely substituted the traditional model of military planning on a solely national basis, it means sharing and being taken into consideration on developments. That planning is now being carried out at a multi-national level within the framework of international organizations with implications for defence, such as the ones that Spain belongs to.

Concepts such as Pooling & Sharing, Smart Defence, the Connected Forces Initiative, the Policy Framework for Cooperation, Framework Na-

¹ We should remember the impact of the fall of the Berlin Wall in 1989 and the disappearance of the Warsaw Pact from defence budgets. They were the so-called «Dividends of Peace».

tion, Cooperative Data Base, etc, emerged in 2010 and 2011 as a means for our part of the world to face up to its loss of military capability. They are usually managed at multi-national forums connected with defence, especially NATO and the European Union, which are obviously the benchmarks for our country since we joined the two, in 1982 and 1986 respectively

The market of military capabilities

The second dimension associated with military capabilities is the one that affects the process immediately after the planning stage, the model for procurement in the defence market.

The economic sector of defence, as well as having the characteristics mentioned earlier of high technological levels and costs of development, production and maintenance, also has many more that we can talk of as being the so-called «specifics of the defence market». These specifics include the long procurement times before obtaining the systems to meet the military capabilities required and the low volume of demand from Ministries of Defence at a national level. This makes it difficult for companies, most of which in neighbouring countries are private, to enter the market. And that is why with most systems there is not a big choice of possible suppliers that would permit greater competition in the defence market and greater efficiency and competitiveness on the part of the companies.

The market for the production of armament and materiel is a sort of quasi bilateral monopoly. On the one hand can be found the Ministry of Defence, acting basically as a «unique client», and on the other side are the suppliers, in many cases exclusive ones, at least at national market level.

The solution to the problems posed by this quasi bilateral monopoly has always been through the state's own regulation of the market, the cooperation between the two sides and the establishment of strategic agreements. Regulation, on the other hand, has always been carried out at national level, without the organizations that are connected with defence of which Spain is a member – NATO and the European Union – getting involved in the legislation and norms of working in such a specific market.

NATO, with its markedly political and military status, is based on a commitment of mutual defence against aggression towards any of its members. It focuses on establishing new forms of political and military cooperation to deal with regional conflicts and on preserving peace and stability. It has not got involved, at least directly, in the regulatory aspects of members in the defence market. Among other reasons this is because of the difficulties in understanding that a trans-Atlantic dialogue on the regulatory

field would bring between the United States and member countries of the Alliance that are also Member States of the European Union².

The European Union, for its part, ever since its founding treaty in Rome on 25 March 1957 - and in successive versions right through to the Treaty of Lisbon - has always taken into account national security interests connected with defence acquisitions as a restriction on the rules of the free market³. That is to say transparency, free competition and no discrimination, by which other market sectors in the European Union are governed.

However, the later evolution of the European Union, including its policy of security and defence - now known as the Common Security Defence Policy (CSDP) - since Lisbon has seen the appearance of a new player. We are referring here to the European Commission (EC).

Since the publication of the Communication COM (96) 10⁴ it has been putting forward analyses and initiatives on the economic aspects of defence - that is to say on the market and the defence industry. Its intervention in the regulatory area of the economic aspects of defence, for which it is qualified under the current Treaty of Lisbon, did not happen de facto until 2006⁵ and has always moved slowly, as we are accustomed to seeing in this European institution.

The military capabilities supply industry

Lastly, globalization has also affected the third dimension in the process of procuring systems to cover the military capabilities demanded by the Armed Forces. I am referring here to the defence industry that supplies them and more specifically to the process of forced restructuring, of adapting to the current size of the market and its necessary internationalization. As a result of the lack of demand from national markets, the industry has without exception, needed to widen its frontiers and go overseas much more than before in order to survive. The process demands a multitude and diversity of financial and human resources which is why many of these companies, especially the SMEs, are not prepared or large

² The free trade treaty between the US and the European Union (TTIP: Transatlantic Trade and Investment Partnership), currently under discussion specifically excludes subjects related with defence.

³ Article 296 of the European Community treaty and the later Article 346 of the Treaty for the Functioning of the European Union which is associated with the so called Treaty of Lisbon.

⁴ COM (96) 10, 24 January 1996, «Problems for the European industry related with defence. Proposals for action at European level».

⁵ It was done precisely with the Interpretative Communication COM (2006) 779 with the then Article 296 of the Treaty of the European Community and later Article 346 of the Treaty of the Functioning of the European Union of the Treaty of Lisbon in the area of defence acquisitions.

enough. On another level it also represents a challenge in the form of a possible loss of technological competitiveness, given the demands for technology transfer asked for by the governments and Ministries of Defence of the buyer countries, especially those in emerging economies. These economies are becoming real players in the defence market, bent on modernizing their Armed Forces and entering aggressively in the market. They have high defence budgets, very attractive for exporters, and clear intentions of pushing through the creation of their own technological and industrial defence bases that will allow them to gain the industrial capabilities that they currently lack. This, without doubt, is a risk factor for the future and for the survival of the technological and industrial base for defence in Europe in the medium to long term. It could cast grave doubts over its dominant technology and therefore its future competitiveness at global level.

The multinational approach to military capabilities. The pooling of capabilities

As was mentioned earlier, one of the areas that has been incorporated in the new paradigm of governance of military capabilities refers to the international framework that is provided by the supra-national organizations connected with defence that Spain belongs to and within which it carries out planning and its processes for procurement and operational availability.

The new multinational focus, developed both within NATO and the European Union, seeks cooperation in the planning of military capabilities, to share their procurement and even what has come to be known in Spanish as «mutualización», although it is an incomprehensible word for Spanish spell-checkers. It is a concept that takes in the idea of mutual confidence and reciprocity in the availability of military capabilities, based on sharing military capabilities by all the members of the international or supra-national organization. This is done in such a way that it is not necessary to employ the resources available at national level to get all the capabilities that it is necessary to have at national level. Instead these resources are concentrated in the procurement of determined capabilities on the understanding that those that do not have them will be lent them or share with others.

The clauses of mutual defence are included both in the NATO Treaty and the latest to come into effect in the European Union, the one from Lisbon. They provide a legal base for this concept of sharing, although it has to be recognized that on its own it is not sufficient when dealing with defence, an area always so linked to the concept of national sovereignty.

The task that it represents for governments, and in particular their Ministries of Defence, is to face up the penury of current defence budgets and, at the same time, the need to keep confronting the threats that continue

putting into danger the freedom and security of citizens. It has resulted in a necessary search for opportunities and an in depth analysis that shows the benefits of cooperation in countering some of the negative effects of that penury. There are opportunities that without doubt mean a revision of the concept of national sovereignty and what is associated with future risk. And, what is important in the Spanish case, of the continuity and evolution of the industrial capabilities it currently has. In Spain's case these capabilities are the result of 30 years of applying continual defence policies, be they in the area of updating the armaments and materiel of the Armed Forces; in the legislative area with the Law on staffing levels for the Armed Forces, which at the time brought budget stability to the Ministry of Defence; in industrial policies, including the compensation linked with major armament programmes, and in the area of special financing for those programmes by the Ministry of Industry, through which the Spanish defence industry was able to reach the levels of technology and competitiveness it now has.

The European initiative: Pooling & Sharing

Worries about the impact of meagre defence budgets on the possible loss of military capabilities in Europe and the risk represented in not making the most of cooperation were expressed by the first executive director of the EDA (2004-2007), the Briton Nick Witney in an article titled: How to stop the demilitarization of Europe. It was published under the patronage of the European Council on Foreign Relations (ECFR) in November 2011⁶. In it he stated:

«What is worrying is not so much the scale of cuts as the way they have been made: strictly on a national basis, without any attempt at consultation or co-ordination within either NATO or the EU, and with no regard to the overall defence capability which will result from the sum of these national decisions».

Information published by the European Defence Agency (EDA) at the beginning of 2015 and referring to data provided by the 27 Member States (pMS)⁷ that took part up to 2013, confirmed a tendency that started in 2006, the year that the EDA started to analyse the information provided by its pMS. There had been a continual reduction in defence spending, despite the inclusion of data from an additional country, Croatia, following its incorporation in 2013 as a new Member State of the European Union.

⁶ Nick Witney. *How to stop the demilitarization of Europe*. ECFR. European Council on Foreign Relations. Policy Brief. November 2011.

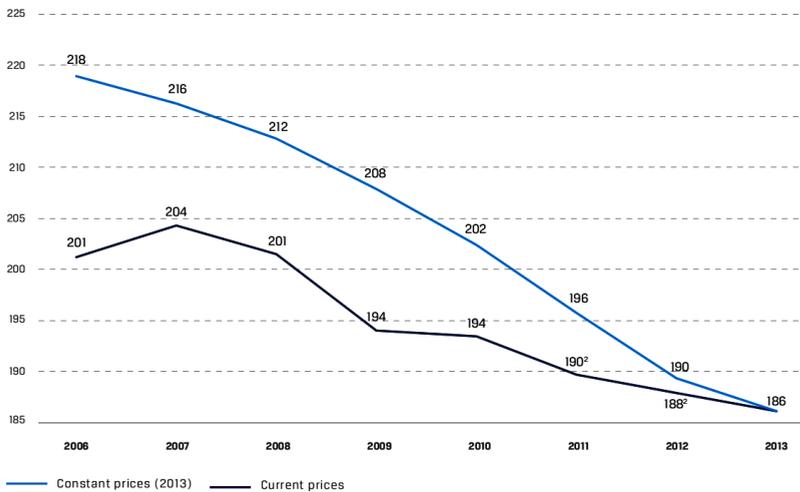
⁷ Denmark is a member state of the European Union but not a participating Member State (pMS) of the EDA because of protocol reasons on joining the European Union, in which the PCSD for the country is not included.

Compared with 2012, in 2013 the reduction of total defence spend was 1.7 billion euros at constant prices. It went from 188 billion euros to 186.3 billion euros, or a 0.9% fall in percentage terms. In the period 2006 to 2013 the cut has been some 32 billion euros at current prices, equivalent to a 15% reduction over the period. In percentage terms of GDP, the defence spend share in 2013 was 1.45%, the lowest figure since 2006. It is a similar when we talk about the spend on defence compared with the total spend by the states. In 2013 it was also the lowest percentage since 2006, at 2.97%.

In the specific case of the Spanish defence budget, the figures are, if possible, even more worrying. As Professor Antonio Fonfría Mesa⁸, has stated: « Since 2008 the initial budget destined for defence has suffered major cuts that could be summarized as being more than 32%. In other words, in seven years the budget has been cut by a third». However, it is necessary to take into account, as Professor Fonfría also stated in his article, that in the case of Spain «the initial budget responds only partially to the final spend that was really made... To that budget it is necessary to add a group of items. These represent, depending on the years, some two billion euros extra, which puts the spend on defence well above the 0.5% of GDP, which one obtains on calculating it from the initial budget, raising the level to a bit more than 0.72% en 2015. In any case it was below the levels prior to 2006».

Defence expenditure in current and constant¹ prices

(billion EUR)



¹Data from 2006 to 2012 has been inflated to 2013 economic conditions. Source of deflator: European Commission ECFIN - based on weight of EU-28.
²Revised data.

Figure 1. Source: EDA Defence Data 2013.

⁸ FONFRÍA MESA, Antonio. *Defence budget 2015: nothing new*. Instituto Español de Estudios Estratégicos. Documentos de Opinión. 07-2015. 12 January 2015.

When one analyses more deeply the variation in the structure of the Spanish budget, the situation is even more critical. The rigidity of personnel costs accounts for two thirds, leaving little room for margin for the rest of the sections, in particular for the share of the budget dedicated to the running costs that sustain the running of the Armed Forces and, of course, for investments. This led to the restructuring of the major acquisition programmes, the so-called PEAs (Programas Especiales de Armamento, Special Armament Programmes), with renegotiations to cut the number of systems that were scheduled to be acquired, which at the same time meant a revision in the level of ambition and goals of military capabilities.

There were some eminently political slogans, thrown out at that moment, promoting the idea of «doing more with less». But this tendency, as a way of getting out of the mire that the drastic reduction in defence budgets had led European countries into, is what was alerted by the pMS data from the EDA, mainly from those most worried about their security and defence. The risk was obvious: the possibility of a lack of coordination among the pMS when it came to analysing, obtaining and prioritizing the military capabilities could lead to the disappearance of certain capabilities considered to be key for Europe in the case of current threats, or to the renouncing of new capabilities needed to face up to future threats.

Defence expenditure as a share of GDP and overall government expenditure (%)

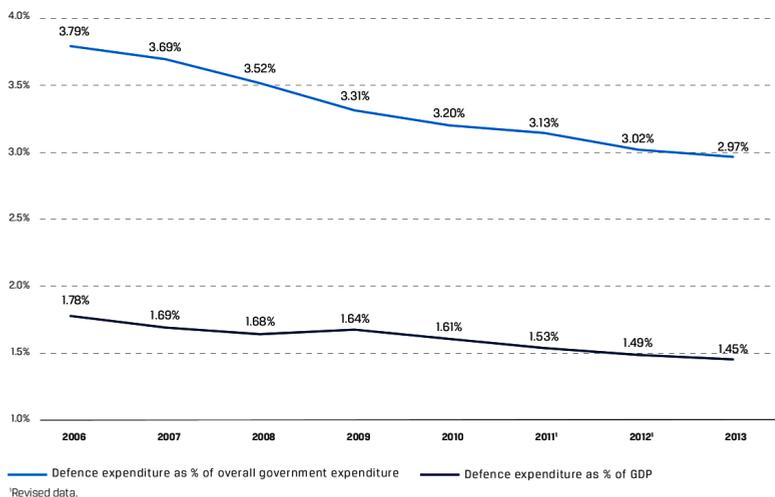


Figure 2. Source: EDA Defence Data 2013.

The political push given to the concept of cooperation in defence material⁹ at the informal meeting of Ministers of Defence of the European Union that was held on 23 and 24 September 2010, in Ghent, under the Belgian presidency at the time, set the scene as an alternative to the loss of military capabilities and consequently the industrial ones that the European Union was facing and which weakened its common policy on security and defence. It came to be known as «The Ghent Initiative».

After the Ghent meeting, representatives of the German and Swedish Ministries of Defence coordinated a «document of reflection»¹⁰. It spelt out the need for cooperation if members wanted to maintain and develop with the same level of ambition that they had had up until then, both at national level and within the European Union, and therefore to keep playing a prominent role in global security. That role had been inserted in the so-called Solana Document: A secure Europe in a Better World. Having been launched in 2003 and revised in 2008, it now looks like a new edition will be part of the agenda of the High Representative of the European Union for Foreign Affairs and Security Policy, the former Italian Foreign Minister, Federica Mogherini.

The German-Swedish reflection document, which for the first time analysed in detail the concept of Pooling & Sharing, set out that in an increasingly complex world nations faced the challenge of remaining ambitious at the same time as having limited financial resources because of the economic crisis and the consequent reduction in defence budgets. All this was embellished in one way by an increasingly exponential rise in the financing needed to take on the investments in hi tech associated with defence systems and on the other by ever higher operative and maintenance costs through the systems' life cycles.

This situation, according to the document, presented one alternative of having to renounce, at least individually, the procurement of a group of military capabilities to take on current and future threats, prioritizing a few in the best case scenario Or, on the other hand, to make the processes of planning and obtaining capabilities common ones. In this way they would focus on the concept of «sharing», in its broadest sense, existing or future capabilities without the need to have them all available national-

⁹ In its broadest sense, and not only now, in the launch of multi-national acquisition programmes that had already had their European benchmarks. Examples of these were the Transall transport of France and Germany; the Tornado project between Germany, the United Kingdom and Italy; the European strike Aircraft, the Eurofighter, between Germany, Spain, Italy and the United Kingdom; and the strategic transport aircraft, the A400M, between France, Germany, Spain, the United Kingdom, Turkey, Belgium and Luxembourg, all of them launched before the start of the 21st century.

¹⁰ *Food for Thought paper* in the terminology of the European Union. It was published in November 2010 under the title *Pooling & Sharing: German-Swedish Initiative. European Imperative Intensifying European Military Cooperation*.

ly. In short, to give a new multinational focus to the planning of military capabilities, combining efforts in the process of acquisitions and sharing operations. It is this that has come to be called in Spanish, as mentioned before, the «mutualization of capabilities».

The goal was no other than to look for benefits and to share the costs and workloads, as had been demonstrated on other occasions with examples of bilateral or regional cooperation in Europe. That is to say through cooperation, preserving and improving national military capabilities, in particular their sustainability and their operability. To do this it was necessary to identify areas of cooperation with the aim of using European resources in the most efficient way to maintain a level of capacities that would ensure both national political ambitions and the credibility of Europe as a key player in the management of international crises.

In the process of analysing military capabilities that would permit the identification of opportunities for Pooling & Sharing, three categories were selected:

The first category grouped together those capabilities and support structures that were considered essential on an individual level by Member States and therefore should be maintained strictly on a national level. Cooperation here was limited to the identification of measures that would facilitate and improve interoperability. The German-Swiss reflection document anticipated, beyond the decisions of each Member State, areas such as intelligence, combat support forces and combat aircraft as systems that would fall within this category of military capabilities.

The second category comprised those capabilities and support structures that offered the possibility of cooperation without creating a big dependency. This category is the one that encompasses the concept of Pooling and in it can be found non deployable support forces, operational training forces and some specific capabilities such as strategic and tactical air transport and logistical capabilities.

The third category would be made up of those capabilities and support structures for which mutual dependence and credibility in the contribution of these capabilities for other members was acceptable as a framework for multilateral consensus. The structures required for education, training and exercises, installations for tests and evaluations, and those for the training of pilots or personnel associated with aerial and maritime surveillance could enter this third category which would be linked more to the concept of *sharing*.

Three criteria were presented in the reflection document as basics when it came to identifying capabilities and to include them in their respective categories: Operational Effectiveness – that is to say making common a specific capability for proportioning the same or superior grade of effec-

tiveness; Economic Efficiency – when it was compared with a solely national focus; and Political Implications – at bilateral or multilateral level in each specific case.

Total number of military and civilian personnel
(absolute figures and % change on previous year)

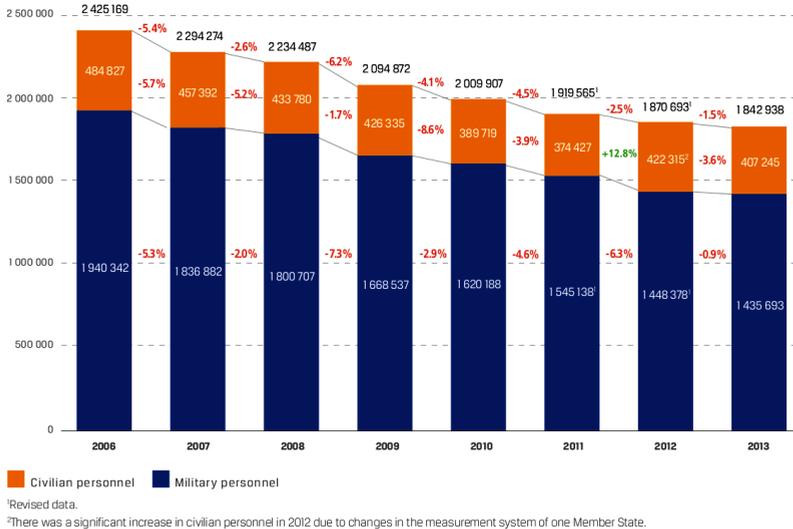


Figure 3. Source EDA Defence Data 2013.

The following fields were identified as possible areas for cooperation: the harmonization of military requirements, research and development, acquisitions, training and exercises, command and procedure structures, and operating costs.

The road to follow that was proposed in the German-Swedish document, within the framework of the intensification of cooperation in defence matters, was based firstly on a systematic analysis of national military capabilities and on support structures in accordance with the three categories listed previously.

Political will was considered to be key for the document, as a basic step to continue deepening the initiative of *Pooling & Sharing* at the European Union. That is why it was proposed that the future declaration, at Minister of Defence level at the Council of Foreign Affairs in December of the same year, should include both the structure of the process and a calendar for implementing the proposal.

The analysis at national level was due to be concluded by the middle of the following year so that it could be consolidated by the relevant organisms of the European Union. The aim was to provide a clear and precise view of national capability development plans, clarifying at the same time

possible cooperation areas that would be presented again to the Ministers of Defence. In this way the Member States would be able to determine on one side the actions to be carried out at national level, and on the other to pick out possible travelling companions for cooperation in specific areas.

Finally, the relevant organizations of the European Union, in particular the EDA, and in close cooperation with other organizations, would act as facilitators for coordinating and establishing correspondence between the different initiatives in line with the level of common ambition at the European Union and on the basis of the goodwill of the Member States themselves. They would be the ones to mark up the content and set the pace for the cooperation in the field of military capabilities.

«The Ghent Initiative» is seen as a call to attention from the European Union to the situation that confronts Member States as far as the development of military capabilities is concerned and a starting point, with a political push, for Pooling & Sharing activities. Since then the EDA, the main body responsible for the development of the initiative, has followed up the process with two parallel activities. On one hand there is the identification of practical solutions on the basis of possible successful deliverables, plus immediate quick wins and long term operational projects. On the other is a more strategic analysis aimed at indentifying potential hurdles in the development of the Pooling & Sharing initiative as well as facilitators and incentives for achieving it As a result, at the meeting of the steering committee of the EDA on 30 November 2011, the Ministers of Defence of the participating Member States backed plans for the analysis of eleven ¹¹ capability areas identified as being potential quick wins for forming part of the *Pooling & Sharing* initiatives:

In addition to these initial opportunities, the EDA has kept increasing the portfolio of initiatives for Pooling & Sharing, as is the case with Training for C-IEDs (Counter Improvised Explosive Devices), one that is in fact led by Spain. Others are in Cyber-defence, both with regard to operative capabilities and to R&D in training and exercises, and in Route Clearance for C-IEDs.

Among facilitating initiatives for setting up Pooling & Sharing projects – within the second, parallel line of activities – is the simplification of procedures associated with authorizations for overflying another country. Others are the implementation in national legislation of European Airworthiness Requirements (EMARS) and the harmonization of regula-

¹¹ The following programmes were identified: HTP: Helicopter Training; MARSU: Maritime Surveillance ES- CPC: European Satellite Communications Procurement Cell; MMMU: Multinational Modular Medical Units; AAR: Air to Air Refuelling; PT: Pilot Training; ENT: European Naval Training); EMTH: European Modular Transport Hubs; SM: Smart Munitions; MILSATCOM: Military Satellite Communications 2020; and ISR: Intelligence, Surveillance and Reconnaissance.

tions for the qualification and certification of munitions, with the goal of increasing cooperation in the areas of acquisition, storing, exchange and transport of these. These are clear examples of the areas of work of the European Union and specifically the EDA.

The Code of Conduct for Pooling & Sharing, one that is not legally binding, was approved by the Ministers of Defence of the EDA countries in November 2012. It supports the efforts made by the states, on a totally voluntary basis, when it comes to cooperating on the development of military capabilities in coordination with their own national defence policies and represents a major milestone in the process of Pooling & Sharing in the European Union.

A later document, on the political framework for long term systematic cooperation in defence, was approved by the European Council at its meeting on 18 May, 2014. This went deeper into the objectives of cooperation in defence, to improve capacity for carrying out missions and operations for the European Union, making maximum use of synergies to improve the development and availability of the civilian and military capabilities needed to carry them out. All of this is supported by the EDTIB (European Technological and Industrial Base) to make it more integrated, sustainable, innovative and competitive. It represents one of the latest efforts by the European Union, at political level, to give a multi-national focus from the points of view of sharing, development, procurement and maintenance of military capabilities at European level. That would be very difficult, if not to say impossible, in an exclusively national way.

Intelligent Defence: The Alliance's Smart Defence

In a speech given at the Conference on Security in Munich on 4 February, 2011, under the title of Building security in an age of austerity, the then Secretary General (SECGEN) of NATO, Anders Fogh Rasmussen, introduced the concept of Intelligent Defence (SD: Smart Defence as it is known in English) at the Alliance.

The SECGEN defined SD as the initiative through which NATO could help nations to «build greater security with fewer resources but more coordination and coherence so that together we can avoid the financial crisis from becoming a security crisis». Unlike the European Union's Pooling & Sharing initiative, what was in play at the Alliance was Europe's credibility as a global player and the permanence of the trans-Atlantic link, given the major cutbacks over the previous 10 years in Europe's contribution to NATO costs. In that period things had changed drastically. Since 9/11, the attention of the United States had drifted towards the Middle East and Asia, which had led the Pentagon to relocate resources from Europe towards those regions while demanding greater involvement from Euro-

pean allies in other theatres of operations. The crisis in Ukraine perhaps changed this trend to a certain extent, but in any case procuring military capabilities remains a challenge for the Europeans and consequently trans-Atlantic relations.

Cooperation and mutual support are integral concepts of the Washington Treaty under which NATO was set up in 1949. Over the years since then they have remained a point of added value for the organization in facing up to the need to safeguard the freedom and security of its members through political and military means. So if cooperation, mutual support and inter-operability in defence are integral parts of NATO's existence, one could ask the question: What does the SD initiative bring that is new?

Before the Conference on Security in Munich, at the one in Lisbon in 2010 that brought together the heads of state and government of the NATO countries, the definition of a new strategic concept for the Alliance was introduced.

Among other things this concept called on countries to increase their collaboration in the area of developing military capabilities, with the aim of minimizing duplications and maximizing their cost-efficiency ratios. As the economic circumstances at the time required, it also emphasized the need to obtain more capabilities with less economic resources. As Fogh Rasmussen said in Munich, the aim was to prevent the financial crisis turning into a security crisis, particularly in Europe.

This new Strategic Concept of NATO established action points to achieve the following improvements:

- Greater deployment capacity for multi-national forces.
- New mechanisms for sharing operational costs.
- Promoting industrial cooperation in defence.
- Coordination between NATO and the European Union.

The Strategic Concept from Lisbon is based on the idea that NATO, as an international organization that brings together 28 countries – among them the most developed as regards military capabilities – can play an important role when it comes to establishing contacts between nations with similar needs but insufficient budgets to cover them adequately on their own. Through collaboration, the aim is to tackle the limitations presented by successive cuts in defence budgets and thus minimize their impact on the Alliance's overall capacities. Just as with the European Union, it is an initiative to pool their wishes and not of supra-national imposition, once again because of the heavy burden of national sovereignty on defence.

NATO would act as a sort of facilitator for the security and defence capabilities that are necessary for the Alliance as a whole. The difficulty lies in that these are not the only capabilities that the countries are asking

for individually, nor necessarily do they have to coincide with the national priorities connected with them. The initiative is aimed at getting the maximum efficiency possible from spending to achieve global objectives with less individual budget. Although industrial aspects are not at the bottom of Smart Defence, a difference with the Pooling & Sharing initiative of the European Union is clearly that it pleads for multi-national policies rather than those for controlling and regulating the defence market at national level, which leads to just the opposite. That is to say, to a fragmentation of the market, which will affect the capacity of industry and block countries from getting efficiency for their spending.

However, efficiency in spending is not the only element that countries have to look at when it comes to collectively achieving security and defence capabilities. The availability of a strong and self-sufficient national industry constitutes a de facto capability that is very difficult to relinquish. But, are there alternatives with the current and unfortunately future budgets, at least over the next five years?

The NATO initiative is based on three inter-relating aspects: prioritizing, specializing and cooperation.

With prioritizing, the intention is to take into account what has been identified by the Alliance collectively as lacking, so that the countries can coordinate the process. Prioritizing will permit higher returns on defence and security. In practice, this will mean close synchronization between the national processes of capability planning and those of the Alliance, to coordinate prioritizing among partners of the Alliance of the collective capabilities that are most needed.

At the Alliance's Summit in Lisbon in November 2010, 10 critical capabilities were defined. These included Cyber-security and the battle against international terrorism and piracy, the use of helicopters, medical support and combating IEDs. The high level of coincidences with the projects of the EDA's Pooling & Sharing is not surprising. Nor is it that the Alliance, at the first stage, put emphasis on generating confidence and securing the political will that is so necessary with projects aimed at changing existing culture and getting new partners to join the initiatives. Cooperation between nations to increase their efficiency in procuring goods and services in the field of security and defence requires, above all, confidence among the partners and, of course, a significant cultural change in the countries' way of doing things.

With specialization, the aim is for countries to take coordinated decisions on what capabilities they should keep, basing this on the strengths of each country and letting other nations complement with their capabilities in a way that all the participants attain a maximum of combined capabilities. It is clear that not all countries can take on all the capabilities. And that given this, it is useful to do it collectively, so that the global capabil-

ities achieved meet as far as possible those that the Alliance seeks as a whole. Logically, the concept of specialization again requires mutual confidence among the members and a well thought-through commitment between each nation's independence on national defence and solidarity in achieving joint goals that are unreachable on their own. Spain's specialization in the area of combating Improvised Explosive Devices, with its NATO centre of excellence at Hoyo de Manzanares, is one such example. The balance between sovereignty and solidarity is key to the success of the initiative. The aim is to select projects, simple ones at an early stage, that help to shed light on how to move ahead with progressively more ambitious ones for shared capabilities.

The *Smart Defence* initiative has an important and differentiating element from that of the European Union, the fact that it has as a member the United States. The revision of this trans-Atlantic link and the commitment of European countries with regards to their contribution to the military capabilities of NATO is without doubt a key aspect of this initiative.

The theoretical approach of both P & S and SD is, without doubt, logical. We start out from a base in which the threats and risks for security and defence are a constant, although with different levels of intensity depending on the prevailing circumstances. The crisis in Ukraine has confirmed this premise. On the other hand, the empirical contrast demonstrates that the economic and financial crisis is having a negative effect on the efforts (budgets) that countries dedicate to defence. That fall in budgets makes it very difficult to obtain the capabilities on an individual basis for each country. There is a big risk that certain military capabilities, including some that may be seen as critical, could disappear if countries decide for austerity reasons not to devote the necessary resources to obtain them, with the implications that would have in global terms for both NATO and the European Union. The corollary is therefore immediate. Given that we are part of multi-national alliances in which we have decided, through political will, to share our efforts against risks and threats, we should put those forces on the table jointly, act in an intelligent way in managing defence, and obtain the benefits that derive from cooperation.

The NATO summits in Chicago in 2012 and Wales in 2014 continued working in the same direction and, as it could only be, have increased the Alliance's portfolio of initiatives. Added to Smart Defence are Connected Forces, Nation Framework and a new focus on allied planning through the NDPP (Nato Defence Planning Process) whose first cycle of four stages has just finished. As the SEC GEN stated at the Chicago summit, NATO had set itself the goal of «modern, tightly connected forces equipped, trained, exercised and commanded so that they can operate together and with partners in any environment. Fundamental to achieving this goal will be improvements in the way we develop and deliver the capabilities our missions require. In addition to essential national efforts and existing, proven

forms of multinational cooperation such as in the areas of strategic airlift and airborne warning and control, we must find new ways to cooperate more closely to acquire and maintain key capabilities, prioritise on what we need most and consult on changes to our defence plans... Maintaining a strong defence industry in Europe and making the fullest possible use of the potential of defence industrial cooperation across the Alliance remain an essential condition for delivering the capabilities needed for 2020 and beyond».

Later, the Secretary General highlighted that «Smart Defence is at the heart of this new approach. The development and deployment of defence capabilities is first and foremost a national responsibility. But as technology grows more expensive, and defence budgets are under pressure, there are key capabilities which many Allies can only obtain if they work together to develop and acquire them. We therefore welcome the decisions of Allies to take forward specific multinational projects, including for better protection of our forces, better surveillance and better training».

But perhaps the paragraph that best reflects the major shift in paradigm by the Alliance was when the Secretary General stated «Smart Defence is more than this. It represents a changed outlook, the opportunity for a renewed culture of cooperation in which multinational collaboration is given new prominence as an effective and efficient option for developing critical capabilities».

However, and without prejudice to their development, some of the activities could be seen above all as being for a political effect and scene setting at the summit. And that, especially after the events emerging on Europe's eastern and southern flanks, they could be relegated to a second level compared with the star initiative of the Wales summit, the launch and approval of the Readiness Action Plan, (RAP) and the Very High Readiness Joint Task Force (VJTF). These initiatives have a much more operative and military direction as a response, initially, to new scenarios and threats in the light of events happening in the east of Europe. But following the efforts of several allied countries, among them Spain, they will also be applied to threats to the southern flank.

The globalization of the defence market

The defence market has traditionally been linked with regulations at national level, mainly in those countries with a robust and well established technological and industrial defence base. This represents a clear goal of self-sufficiency and protectionism that guarantees, as far as possible, national autonomy when it comes to producing and proportioning the systems required by the Armed Forces. But also, and this should be underscored, with a strong dependency of these forces on that industry when it

comes to defining their needs in armament and materiel. In many cases the weapons acquired do not necessarily cover an operational need but one for industrial development. We have had examples of this in Spain, in land, naval and air sectors, mainly in cases where the state has a majority shareholding in these companies.

Within the framework of bilateral and multinational treaties related to the markets in general, the defence one has always been excluded. Such was the case with the Treaty of Rome, under which the European Economic Community was created. With the defence market, as it dealt with matters of national security, this area was given an exception under article 296 of the treaty. It stayed outside the regulations of the internal common market and therefore the rules on transparency, free competition and non-discrimination.

The inclusion of a Common Policy on Security and Defence in the Treaty of Maastricht opened up a new era. On one side there was the prominence that different community institutions would have from then on in defence issues. On the other came a commitment from Member States, little by little increasingly more legally binding, on defence issues.

With all this, the first «intrusion» - if I am allowed to call it that - from the institutions of the European Union in defence issues began with its economic aspects. Later, gradually, came the build up of structures -conceptual, operative and joint development of military capabilities - that have mainly taken place since the start of this century. (Creation of a European Union military staff office, the military committee, political and security committee, or the EDA).

The Communication from the EC, COM (96) 10, final, of 24 January 1996, referenced at the start of this chapter, began with a statement that « the defence-related industries are facing an economic and political context which is changing completely and calls for responses "going beyond the national level"»¹².

Given the recent start up of development of the CSDP at that time, it is evident that the emphasis in the Commission's Communication was put on the purely industrial aspects and employment in the defence sector, without venturing into the regulatory side of the market or the joint development of military capabilities. Further on, the communication referred to the need experienced by industries connected with defence to substantially reduce their activities as having had «direct and important repercussions in reducing the number of jobs» which had fallen from 1.6 million to 1 million between 1984 and 1992 (-37%)¹³. This was especially

¹² The italics are the author's.

¹³ We should remember that the end of the Cold War had considerably reduced - at least theoretically - the threats to security in Europe. This allowed countries, through

true in some regions, affecting the manufacturing base and the capacity for innovation of all European industry.

Further on it refers to the then current crisis in the European defence industry not being solely due to the reduction in military spending but also to growing international competition and especially the anachronistic fragmentation of the defence market in Europe. That was why there was a change of attitude taking place in favour of the European Union taking action.

The Communication was a sort of «shot across the bows» for Member States, announcing that the defence sector was also going to start to be part of the EC's portfolio of activities. However, the real incursion by the EC in regulations linked with the economic size of the defence industry would not happen until 10 years later with Communication COM (2006) 779 and later, in 2009, Directives 2009/43¹⁴ and 2009/81¹⁵ obligatory for Member States of the European Union and specific to defence.

Despite the above, I believe it is fair to highlight the important role that the European Defence Agency has played since its creation in 2004, until almost the revision of its statutes in 2011, in the process of establishing a climate of confidence between the Member States taking part in the many initiatives it set up in the market and the defence industry. In particular, there was the Code of Conduct for Defence Acquisitions, the Code of Best Practices in the Supply Chain and the strategy for strengthening the technological and industrial base for defence, which largely facilitated the path followed by the EC since then.

The EC, which is emerging as a new player in the defence market, one that is traditionally regulated and protected by the individual states, has been very active and is here to stay. Its goal in this field is clear: the creation of a true single European market in defence (EDEM: European Defence Equipment Market) in accordance with the rules of transparency, free competition and non-discrimination that cover the rest of the sectors of the European Union's internal market. It is an objective that from the point of view of any professional connected with the world of defence acquisitions looks excessively ambitious as it does not take into account, at least not completely, the specifics of the defence market, among these aspects tied in with the concept of national sovereignty.

the so-called «dividends of peace», to cut military budgets and accentuate the trend of converting the industries affected.

¹⁴ Directive 2009/43/EC from the European Parliament and from the Council, dated 6 May, 2009, on the simplification of terms and conditions on the transfer of defence-related products within the Community.

¹⁵ Directive 2009/81/EC from the European Parliament and from the Council, dated 13 July, 2009, on coordination of the adjudication procedures for certain contracts on works, supplies and services in the areas of defence and security, modifying Directives 2004/17/CE and 2004/18/EC.

This new player, with powers recognized in the Treaty of Lisbon and responsible for the supra-national legislation of the European Union, has already brought change in the way Member States act when it comes to contracting defence systems to cover their current capacity needs and for which they need to be prepared, both at government and industrial level. I regret the change there has been in the role foreseen for the European Defence Agency in this context. As an inter-governmental body made up of the Ministers of Defence for the participating members states it could have played a very relevant role in broadening and developing the Common Security and Defence Policy (CSDP) and in particular in the defence industry market. However, that role has become increasingly blurred and limited in the presence of the all powerful CE.

Nevertheless, the economic crisis was a major setback for all the activities begun by the European Union to set up a truly European defence market (EDEM) and strengthen the technological and industrial base for defence (EDTIB) as the lack of money in defence budgets has had a direct impact on cooperation projects.

Despite this, and trying to resurge from the ashes like a Phoenix, the European Union returned to the attack in 2012. Following the high level conference on the defence market and industry on 23 May, 2011, Vice President Antonio Tajani, responsible for business and industry, and Commissioner Michel Barnier (for the internal market) launched a Task Force. Led by the European Commission, and with the participation of the European Defence Agency and the EU's External Action Service, it would have the mission of exploring the political options available to the Commission to carry out the task of delving deeper into the process of setting up a truly European defence market and strengthening the European defence industry. Its three priorities were clear: defence industry policy, research and innovation and the interior market for defence. Throughout 2012, the Task Force met up with the main stakeholders, both from within the European Union itself and from Member States and industry, playing a fundamental role when it came to taking defence to the European Council in 2012.

The European Council, 13 and 14 December, 2012

The conclusions of the European Council meeting of 13 and 14 December, 2012, set up another milestone in the process. They invited the High Representative for Foreign Affairs and Security Policy and - mainly through the External Action Service and the European Defence Agency, as well as the European Commission – all those people cooperating within the framework of their responsibilities “to develop proposals and specific actions for strengthening the Common European Policy on Security and Defence and to improve the availability of civil and military capabilities in

the Union». All this took place without forgetting the necessary and close collaboration with Member States during the process and setting the goal of presenting these proposals and initiatives by no later than September 2013, ahead of the European Council meeting to be held in December 2013.

On this occasion, given the development of the CSDP since that first EC Communication of 1996, and with the support of the Treaty of Lisbon which had come into force on 1 December 2009, the focus went beyond the purely industrial and employment aspects to include the three dimensions linked with the CSDP.

Firstly there was the most political dimension, the one connected conceptually with the CSDP and with the objective of “increasing the efficacy, visibility and impact of the CSDP». This would continue with the development of a global approach on prevention of conflicts, crisis management and stabilization, as well as the capability to respond to security emergencies, reinforcing the European Union’s capability to rapidly and effectively deploy civil and military capabilities and adequate personnel in the whole range of crisis management actions.

In second place were all matters related with the process of planning and procurement of capabilities. The objective was to improve the development of defence capabilities, pointing out duplications and parts that were lacking; and establishing priorities for future needs in civil and military capabilities. This would facilitate a more systematic and long term European cooperation in defence, including putting in common use and sharing military capabilities. The conclusions of the Council pointed to the usefulness of the Member States, on planning national defence, to take note from the start of the need to cooperate, to favour synergies in bi-lateral, sub-regional, European and multi-lateral initiatives, including sharing between the European Union and NATO’s Smart Defence.

Lastly came the part related to the economic aspects of the CSDP. The goals here were to fortify the European defence industry sector, developing a technological and industrial base that is more integrated, sustainable, innovative and competitive; to establish bigger synergies in research and development between civil and military areas; and to promote a defence market that functions correctly, particularly through the effective application of directives relating to public contracting and transfers within the European Union, a market that should be open to SMEs and one that benefits from their contributions.

During 2013, and continuing with the directives of the European Council of December 2012, a Communication was published by the European Commission and a report by the High Representative for Foreign Affairs and Security Policy.

Activities of the European Union within the framework of CSDP

Communication of the European Commission of 24 July 2013

The first Communication¹⁶ of the EC after the Council meeting of December 2012 saw the light on 24 July 2013 and focused, in particular, given the competencies taken on from the Lisbon Treaty, on the third part of the conclusions from December 2012; the strengthening of the defence industrial sector as a key part of the development of the CSDP. The Communication resumed the strategy of the EC expressed by the then President of the Commission, Duraõ Barroso: «The Commission is complying on its part. We are working in pursuit of a single defence market. We are using the competencies from the Treaty to develop a European industrial base for defence». The following seven areas of interest were included in the Communication.

«Reinforcing the internal defence market guaranteeing» on one side «the market efficiency» through supervision of the level of opening up of the defence markets by Member States and specifically through the use of Directive 2009/81 and the limits on certain exclusions listed in the directive; on other side «facing market distortions» working on a progressive removal of compensations and to make comply with all the conditions when there is an appeal against Article 346 of the Treaty on the Functioning of the European Union (TFUE) to justify the concession of State aid; finally «improving the security of supply» through a consultative process that aims to achieve political commitment from Member States to mutually guarantee the supply of material goods or services, optimizing the regime of inter-community transfers of the goods or services included in Directive 2009/43 and drawing up a Green Paper on the control of sensitive industrial defence and security capabilities.

«Promotion of the competitiveness in the defence industry» was the second analysis point proposed by the Commission. Five activities were included in the Communication. Firstly came «normalization», developing the bases for cooperation and competitiveness in the field of defence. Secondly, «promoting a common approach on certification», to reduce costs and accelerate development. Then came «action on the insecurity of supply of raw materials that are critical for the European defence industry». Fourthly, there was «ensuring a nucleus of European innovation in defence, focusing on SMEs, their clusters and regional networks. And finally, managing change and guaranteeing the future with regard to capacities and professional competencies».

¹⁶ Communication COM (2013) 542 of the European Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: «Towards a more competitive and efficient security and defence sector».

The third area of interest centred on «taking advantage of the potential of dual use research and pushing innovation», while supporting the possibility of research linked to the CSDP through a Preparatory Action.

«Capability development» was the fourth action point, with the aim of guaranteeing that Europe has the whole range of capabilities, that they are used in a profitable way and that they are inter-operable.

«Space and defence», the fifth line, with the objective of covering the gap between civilian and military space activities, to diminish dependence on third (non European) countries on certain basic technologies that can often be subjected to export restrictions. «The protection of critical infrastructure, satellite communications and the setting up of a high resolution satellite capability» were the action points in this line.

«The application of energy policies and European Union support instruments for the defence sector» was the sixth area, focusing on studying in the area of defence the applicability of concepts, legislation and support instruments in the energy area in force in the European Union, as well as backing the European Armed Forces' Go Green pilot project on using photovoltaic energy.

Lastly, the European Commission included among its initiatives «the intensification of the international dimension by "promoting competitiveness in third country markets and reviewing the control policy on dual use exports».

The report of the High Representative of 24 September 2013

The report of the High Representative that also came out of the Conclusions from the Council meeting of December 2012 was passed on to the European institutions and Member States on 24 September 2013. Although the report looked at aspects of the three main points established by the European Council in December 2012, it focused logically on the first and second ones, leaving the third more in the hands of the Commission which had already included its proposals in the Communication published on 24 July 2013.

The proposals included in the High Representative's report related to the point on clusters and focused on six groups of specific actions.

The first group proposed further development of a comprehensive approach on the prevention of conflicts, involving crisis management and stabilization, by strengthening regional perspective and ensuring close cooperation and alignment between the different missions of the CSDP and the operations in certain regions (Sahel, Horn of Africa, Balkans). The goal was to carry out activities and policies that increased the impact, effectiveness and visibility of European Union actions.

The second focused on the visibility of the CSDP itself. The message to citizens in the communication on the importance of security and defence, even when threats do not feel close, is key. The promotion of a culture on common security and defence is fundamental. That is the reason behind the European Union campaigns with the slogan Security and Defence matters, in which the play on words in English with matters refers both to affairs and importance.

The third referred to the capacity of response to new security challenges (networked security). Areas such as security in space, the cybernetic field and energy networks are crucial today for society, it said. «Union activities in these areas should be priorities».

Increasing capacity to respond to challenges taking place on the borders of the European Union was the fourth point, pointing to the need to develop and implement a maritime security strategy for the Union.

Making it possible to carry out a timely and effective deployment of appropriate assets to deal with the broad spectrum of crisis management operations was the fifth group of actions. The report spoke here of the necessity to consider the possibilities arising from the Treaty of Lisbon (Article 44 and its working balance), as well as the new focus on rapid response assets, including Battle Groups.

Lastly, referring to Group I Clusters, the High Representative proposed concentrating effort on analysis of the prevention of conflicts and post-conflict management. The document referred to the need to create a culture on the awareness of conflicts and to gradually develop an early warning system for them.

In reference to Clusters II, the report put forward four groups of initiatives. The first was to work on more systematic and long term cooperation in defence. It pointed out that Member States needed to include in their capability development and planning the concept of Pooling & Sharing, as well as a greater application of the Code of Conduct. Also, that sharing future plans on military capabilities is critical for being able to cover current shortfalls in capacity. There were lessons to be learnt from changes in the processes and models of acquisition and rationalization of demand. These included common requirements, *Pooling & Sharing* activities in logistic support, searching for incentives to defence cooperation, specific agreements connected with financing, fiscal matters and the possibility of using the Permanent Structured Cooperation mechanism envisaged in the Treaty of Lisbon, all clear areas for improvement.

The second initiative refers to a greater focus on obtaining key capabilities. In-flight refuelling, unmanned aerial systems, cyber-defence and government satellite communications are seen as offering high potential,

both from the point of view of a European focus on capability developments and on dual use technologies.

Facilitating synergies at bilateral, regional, European and multilateral levels was the third proposal from the High Representative for this second Cluster.

Finally, the report included a proposal for improvement in the generation of civil capabilities, with the aim of maintaining it as a priority area. It spoke of this being more complex than those of a military character due to requirements in the selection process and the lack of specialized personnel.

The European Council of 19 and 20 December 2013

Defence matters. This phrase, with its double meaning in English, as was mentioned before, led the conclusions from the European Council meeting of 19 and 20 December, 2013 in the section on security and defence.

It followed a series of activities carried out at the heart of the European Union in 2013 that emerged from the conclusions of the Council's meeting in December 2012 and included in its agenda integral defence issues. Namely, the ones that embrace the three dimensions of the CSDP - policy, military capabilities and defence industry and market - reinvigorating the debate on them.

Defence matters returned to the Council's agenda after several years of little visibility for the CSDP beyond issues connected with civil, military and mixed operations which were already under way. And it returned, in principle, to stay. The conclusions invited the Council, the Commission, the High Representative and Member States, within their respective areas of competency, to take decisive and demonstrable measures to put into practice the directions given by the Heads of State and government. They also pointed out that the European Council itself would evaluate the changes taking place in all these areas in June 2015, as well as providing new pointers based on the changes.

Within the framework of the effectiveness, visibility and impact of the CSDP, it has to be taken into account that more than 7,000 personnel are deployed on different civil and military missions run by the Union. These are underscored by the Union's total commitment to working closely with global, transatlantic and regional partners, facilitating training, assessments, equipment and resources so that they are increasingly more capable of avoiding a crisis or having to manage one alone. The Council's meeting in December emphasized the need to improve the European Union's rapid response capabilities, including through more flexible and deployable combat groups, if the Member States agreed on this.

In this context, the European Council called on the High Representative to work closely with the Commission to evaluate the effect of these changes in the world and, after consulting Member States, to inform the Council in 2015 about the challenges and opportunities these represented for the Union.

Recognizing that collaboration is crucial in the development of military capabilities to maintain key capabilities, resolve shortcomings and avoid duplication, the European Council gladly received proposals for four specific areas as future projects. These were: the development of RPAS (Remoted Piloted Air Systems) in the period 2020-2025; of an in-flight refuelling system using multi-function aircraft that could also be used as transporters; of government communications via satellite, including in this case the European Space Agency (ESA) as a key go-between; and cyber-defence through the drawing up of a work plan and specific projects focused on instruction and exercises, and improving civil-military cooperation using the European Union's Cyber-Security Strategy as a base.

Lastly, the European Council meeting of December 2013 underscored the need to work on the EDTIB to make it more competitive, more innovative, more sustainable and more integrated for defence capabilities that increase Europe's strategic autonomy. This would ensure effectiveness of operations and supply, at the same time fomenting highly qualified jobs in the defence sector and growth for the European Union as a whole.

Special reference was made to dual use research, with an announcement that preparatory action would begin on research connected with the CSDP and which makes maximum use of synergies with national research programmes and with certification and standardization, with the goal of reducing costs, harmonizing demand and promoting inter-operability. This action would also involve SMEs, by pushing for improved access for them to the security and defence markets and promoting their participation in future finance programmes of the European Union and the SoS (Security of Supply), a basic element in the development, long term planning and functioning of the internal market. Taking into account the framework agreement on SOS reached at the EDA, a road map was called for to set up an overall programme of security of supply at European Union level that embraces the global character of vital supply chains.

The roadmap of the EC of 24 June 2014

As part of this slow but continuous advance by the European Commission in the development of competencies in the defence area, a Road Map¹⁷ was published in June, 2014.

¹⁷ COM (2014) 387 final 24.06.2014. Report from the Commission to the European Parliament, Council, Economic and Social Committee and the Committee of the Regions, «A

The Commission's goal with this new Communication was to establish a route to follow for introducing the different initiatives that had been foreseen in the Communication of July 2013 and specifically to continue broadening the following aspects:

- A monitored internal defence market in which the Commission would keep watch over the correct application of Directive 2009/81, as well as the use of exclusions by Member States; in which there was no room for industrial compensations and in which European companies and sub-contractors can operate freely and without discrimination throughout the European Union.
- The establishment of a security of supply system at European level in which Ministries of Defence can be sure of receiving sufficient supplies in all circumstances, no matter in which Member State the supplier is based.
- A more competitive defence industry through specific actions in the areas of standardization and certification, raw materials, SMEs, clusters, regions and the skills and qualifications associated with such a technological sector as defence.
- The exploitation of the potential of the dual use concept for civil and military technology, promoting research and innovation and the search for synergies between civil and defence research. All this via a Preparatory Action on research connected to the CSDP through which the potential of a European research programme that in the future can cover both security and defence can be explored.
- Development of necessary capabilities for Europe through the joint evaluation of aspects such as a system for sharing information in the maritime area that encourages civil-military cooperation.
- Development of European capabilities connected with defence and space.
- An increase in the international scope of the European Union to promote competitiveness in third countries and the control of dual use exports.

Working on the basis of a deeper relationship between the worlds of civil and defence and the reality that the dividing line between them, as far as technology is concerned, is becoming ever less clear, the Commission, with its Road Map – through which it will announce policies on the internal market, industry, research and innovation – will take the lead in the contribution of European institutions to the strengthening of the European security and defence sector.

new deal for European defence». Road Map for the application of Communication COM (2013) 542, «Towards a more competitive and efficient security and defence sector».

The Council of Foreign Affairs of 18 May, 2015

In spite of the commitment from the European Council in December 2013 to evaluate the specific advances made in all matters regarding the CSDP, which were included in the conclusions and in the work carried out in 2014 by the European Union institutions involved – that is to say the Commission, the High Representative for Foreign Affairs and Security and the European Defence Agency, in coordination with Member States – the inclusion of defence issues at the European Council meeting of June 2015 was put into question for various reasons. These included the Greek crisis and the general elections in the United Kingdom, with the implications these might have on any demonstration of commitment with European policies, including defence, on the part of the British government.

However, on 16 March 2015, a letter was sent by High Representative Federica Mogherini to the President of the Council, Donald Tusk, following conversations held at the informal meeting of Ministers of Defence in Riga on 18 February, during the rotating presidency of Latvia. The letter confirmed that the debate on the CSDP would be resumed at the Council in June 2015 and that she would release the report in April to prepare for it. Together with the input scheduled from the Commission, it would provide the basis for the conclusions that were due to be adopted at the Council of Foreign Affairs, which would be attended by Ministers of Defence, at their meeting on 18 May and serve as a reference point for the Council. In a joint letter dated 5 May from the High Representative and the Commissioner for the Internal Market, Poland's Elzbieta Bienkowska, they sent their respective reports to the President of the European Council.

The letter spoke of the changes that had taken place in the global scenario since the European Council meeting in December 2013 and the challenges and opportunities these represented for the European Union. At the same time it recognized the fact that Member States were still the leading players when it came to establishing priorities in the CSDP framework and underlined the important role that the European Union could play in this context. This was not only because of the Union's responsibilities under the terms of its treaty, but also because European security depended increasingly on cooperation and a collaborative focus on the planning of capabilities, research, the development of technologies needed to cover these capabilities, and the harmonization of demand and strategies for acquiring systems.

Member states have been striving to underscore the importance of developing in parallel the initiatives involved with the three clusters that were the focus of the work that emerged from the European Council meeting of December 2013. Some have even said they are in favour of sequential developments of the initiatives, that only the advancement of a truly common policy on security and defence will allow them to get further involved in the other two clusters - the joint development of capabilities,

the setting up of a real internal defence market and the strengthening of Europe's industrial base in defence. I don't think the content of the joint letter from Mogherini and Bienkowska gives much relevance to the sequential implantation of the three clusters. It is true the detailed reports from the High Representative and the Commissioner that were sent with the letter include an analysis of what has been done so far in each of the areas and provides directions for the future for all and each of the clusters. But, in my opinion, the speed at which the initiatives of the Clusters III group is developed will not depend on or be limited by the speed at which those included in Clusters I and II develop.

The conclusions to the meeting of the Council on Foreign Affairs on 18 May, 2015, a preparatory one for June 2015 as far as the CSPD was concerned and taking into account the dramatic changes there had been in the European security scenario in recent years, returned to the theme of the importance of a stronger Europe with a more effective CSDP. The work being put into a revision of the European Strategy for Defence, what was called the Solana Strategy when it was published in 2003 and was revised in 2008, is seen as a fundamental aspect when it comes to updating the European commitment to the world scene and the challenges and opportunities that this represents for the European Union.

Continuing with the analysis structure of the CSDP that was set out in the European Council meeting of December 2012, the one from Foreign Affairs from May 2015 revised the activities to be carried out within each of the three clusters. The meeting recognized there had been adequate progress with the commitments taken on in 2013, while admitting the advances had been limited in some areas.

In the area of improving the effectiveness, visibility and impact of the CSDP, which corresponded to *Cluster I*, tribute was paid to the significant contribution of the then current 11 civil missions and the five military operations of the European Union to peace and international stability¹⁸. There was also satisfaction with the implementation of the Comprehensive Approach to conflicts and external crises, including the Action Plan for 2015 and the concept of Military Rapid Response. It was stated yet again that the EU Battle Groups should continue to be the primary rapid reaction tool of the Union. Equally, there was encouragement to continue the work started in November 2014 in the field of Space Surveillance and Tracking and the high resolution images based on the assets of Member States and the GNSS (Global Navigation Satellite System), the latter an aspect of great importance for the future of the Spanish aerospace sector.

¹⁸ EUAM Ukraine; EUBAM Libya; EUBAM Rafah; EUCAP Nestor; EUCAP SAHEL Mali; EUCAP SAHEL Niger; EUFOR Althea; EULEX Kosovo; EUMAM RCA; EUMM Georgia; EU-NAVFOR Atalanta; EUPOL Afghanistan; EUPOL COPPS; EUSEC RD Congo; EUTM Somalia and EUTM Mali.

With regard to the development of capabilities, in Cluster II, the Council on Foreign Affairs stressed the need to continue expanding the four projects launched following the European Council meeting in December 2013¹⁹. Cooperation remains a key issue for the Council which sees it as a fundamental element in the development of capabilities. The use of the framework created at EDA and in the longer term the Policy Framework for Systematic and Long-Term Defence Cooperation, which was adopted in November 2014 - always taking into account the processes of national decisions - are seen as equally important.

Lastly, with reference to Clusters III, the Council meeting of 18 May announced it was pleased with the advances made by the Commission and Member States with Preparatory Action on research and innovation. This is scheduled to be launched by the Commission in 2017 and the Council again highlighted its importance for applying Directives 81 and 43 of 2009, without prejudice to what appears in Article 346 of the TFUE, for the report on its implementation. This report from the Commission and the EDA, in close cooperation with the Member States, will be presented in June 2016. The continuity of work connected with certification, support for SMEs to access the defence market and Security of Supply are still seen by the Council as fundamental for the creation of a truly European defence market (EDEM).

In line with the budgetary goals set out at NATO's summit in Wales, the Council on Foreign Affairs once again made reference to these objectives that, on a voluntary basis, were adopted at the meeting of the steering committee of the EDA attended by Ministers of Defence in 2007²⁰.

In short, the Council on Foreign Affairs of 18 May signified continuity in the political will expressed by the European Council in December 2013 with a clear proposal to track and maintain the so-called «Political Moment», as it is up to the Council itself to revise the situation again in 2016. However, the reality of the specificity of defence matters associated with national sovereignty and meagre defence budgets, and therefore implications in the potential progress of CSDP, still float in the air at all these meetings.

The European Council of 25 and 26 June 2015

The long-awaited conclusions on the CSDP from the Council meeting on 25 and 26 June did not meet expectations, at least for the most demanding. The euro-sceptics have used the occasion to argue, yet again, that the European

¹⁹ Air to Air Refuelling, Remotely Piloted Aircraft Systems (RPAS), Governmental Satellite Communications (GOVSATCOM) and Cyber-defence.

²⁰ 20% of the total spend on defence for equipment, 35% of that 20% on European acquisitions for cooperation; 2% of the total spend on defence on R&D and innovation, 20% of which is on European cooperation programmes.

Policy on Security and Defence is far from being common and a key point in the Council's Agenda. However, I think there is nothing new under the sun. As has become normal when introducing new supra-national policies in the European Union, periods of activity and inaction have succeeded one another over its nearly 60 years of existence. But it keeps moving forward, albeit slowly, and leaving along the way small consolidated packages of regulations and activity that affect and are a commitment for Member States.

It is true that more was expected than the three sections that were presented and summarised in a single page of conclusions and that touch on the CSDP in a way that appears very light and in passing.

Indeed, the conclusions from the European Council in June recognized that the security situation had changed drastically²¹, instead of making use of the occasion to highlight and evaluate all the initiatives that had been started since the council met in December 2013, or to set up a detailed new road map ahead of the next meeting at which it will be decided to talk again about CSDP. The conclusions indicated very briefly some specific actions in the following three inter-connected areas.

- Renovation of the Internal Security Strategy for Europe and implementation of guidance points related to the fight against terrorism that were approved in February 2015.
- Continuation of revising the European global strategy on foreign policy and security with the goal of presenting it in June 2016.
- Continuing work connected with the conclusions of the European Council of December 2013 and of the Foreign Affairs Council of 18 May 2015. Special reference was made to the need for Member States to reach appropriate levels of spending on defence, as well as ensuring an adequate European budget for starting on the preparatory action on research connected with the CSDP. Also, to promote a more systematic form of cooperation in defence that will allow the development of capabilities; the mobilization of European Union instruments to fight against hybrid threats; and stepping up partnerships with the United Nations, NATO, the Organization for Security and Cooperation in Europe (OSCE) and the African Union (AU).

Lastly, it notes that the Policy for Security and Defence will remain on the agenda of the European Council.

Without doubt, a new opportunity was missed for the Chiefs of Staff and government to keep supporting a common policy on security and defence.

²¹ On the same day the Council meeting finished there were fundamentalist Islamic terrorist attacks on three different continents, in France, Tunisia and Kuwait. The President of the Council, Donald Tusk, expressed his regrets in his press release following the Council.

The circumstances at that moment, led by the crisis in Greece and the terrorist attacks in France, Tunisia and Kuwait prompted a change in the agenda, although the attacks served to rekindle the necessary revision and updating of the European security strategy.

The internationalization of the defence industry

The defence industry is a key element in the maintaining and development of military capabilities and, of course, a sector that contributes to the economy, not only from the point of view of its share of GDP but also in the areas of research, development and innovation.

This sector is confronting a variety of challenges in the short and long term. In addition to the increase in the costs of equipment, mainly those associated with R&D because of the high technological content, European defence budgets have suffered important reductions. Also, the sector faces on one side stiff competition from traditional producers and, on the other, from countries with emerging economies. These countries are currently receivers of the exports of these traditional manufacturers, but given their growing demands for the transfer of technology are also turning into competitors.

Likewise, while the civil and security markets, based on dual technology, can offer new opportunities for the defence industry, the sector faces greater competition from civil industries with the capacity to provide innovative technology to Ministries of Defence. The defence industry sector as a whole is globalizing and becoming increasingly integrated with the broader sector of civil industry.

What is more, although the European defence industry has some examples of success in consolidation it is still seen as being too fragmented, in particular the naval and land sectors. Without getting involved in the sovereignty aspects of defence, and looking at it purely from the economic point of view, this leads to duplications and over-capacity in the industry.

When we compare European defence companies with their global competitors, they remain smaller in size and only a few are among the world giants. In many of these cases they have reached the limits of the national market as a result of the meagre defence budgets. This circumstance has become the main argument used by international organizations to promote cooperation through initiatives like the European Union's *Pooling & Sharing* and NATO's *Smart Defence*. Until now it has not led in practice to the results that were expected from the launch of cooperation programmes.

Taking into account that defence is still a matter of national sovereignty and will remain so in its deepest sense, it has to be recognized that the

initiatives being launched by NATO and the European Union open a door to the future for the sector. Even if some of these initiatives may seem to be not very acceptable in the short term, especially those that are connected with the sharing of capabilities.

We must not forget the factors and principles that should rule in all these initiatives, that is to say providing our Armed Forces with systems that have the maximum military effect, incorporating inter-operability with allies as a key requisite, and seeking the right balance between price and quality. What should also be taken into account are the factors of economic growth and the operational autonomy associated with the development of the defence industry.

Three aspects can be seen as critical for the future of the sector: innovation, competition – and as a result, competitiveness – and, lastly, the size of these industries. Improving on innovation and the competitiveness of the defence sector, together with the critical size needed to give the industry access to global markets is a long term process that will include an analysis of weaknesses in the market and any obstacles to getting there, beyond the one of national frontiers.

Developing the European defence market, aiding access to it for small and medium size enterprises, encouraging cooperation and prioritizing research and development have been noted in the Preparatory Action Plan linked to the CSDP that has been launched by the EC. These are basic elements for avoiding the loss of industrial capabilities in Europe, which would be practically impossible to recover if activity in these areas was discontinued for long. The technological and industrial capacity linked with combat aircraft, mainly in the field of RPAS (Remotely Piloted Aircraft Systems) is clearly a sector in which Europe runs a serious risk of remaining way behind.

Greater convergence in acquisition plans among neighbouring countries and greater competition based on the criteria of equal opportunities – the Level Playing Field – are key pieces on the road to follow. The report on the implementation of Directive 2009/81 by Member States that the European Commission will have to present next year, based on a transparent and impartial analysis of the implementation and use of the directive in the national legislation in those states, will also be a key element in growing the mutual confidence that is essential for creating a true European defence market.

The defence industry needs new and more aggressive strategies for international trading. Getting out to overseas markets is a priority, much more than before, to be able to survive. But the risk in meeting the demands of countries with emerging economies for the transfer of technology should not be forgotten, with an eye on their competitiveness in the future.

A so-called «Third Offset Strategy» was launched at the Reagan National Defence Forum in December 2014 by the US Defence Secretary Chuck Hagel. Its name refers back to the «New look doctrine» of the 1950s, introduced by President Eisenhower and the «Offset Strategy» of the 1970s and 1980s. Through innovation in technology it aims to maintain a gap with other countries, one that avoids technological competition and in this way continue the US military supremacy that perpetuates its status of world power.

Conclusions

Throughout this chapter, the aim has been to highlight the new paradigm in managing issues connected with military capabilities and the great importance the international dimension has in this. Defence, in its most integral sense, is no longer a matter that is handled exclusively at national level. This affects the planning of military capabilities as much as the rules of the market and the defence sector itself, whose vision and international business strategy are now indispensable for their survival.

The economic and financial crisis that has been suffered over the last 10 years has forced countries to reconsider their debt levels. That has meant a revision in spending priorities which, in turn, has had a very negative impact on defence budgets in the majority of western countries. There is a great political pressure, growing ever stronger, in the democratic countries around us to give priority in state spending to social benefits linked to education, health and homes. This lack of resources has had a direct impact on defence budgets and with it the development of military capabilities, thus increasing the risk of losing industrial capacities that in turn put in risk the innovation, economic growth and employment that the sector brings.

This situation coexists with one of threats that have not only ceased to exist but has seen new ones emerge where it was thought that there would no longer be conflicts that put the stability of the world – and therefore ours and that of our neighbours - in danger. In spite of that, the perception of citizens towards those conflicts and the importance of defence continue to have a very low profile. That is why the actions of governments in acquiring military capabilities remain politically difficult. This situation has brought about the appearance of new players, even if they are not new as such. We are referring here obviously to NATO and the European Union, which are new in the integral management of defence affairs (planning of military capabilities, the market and the defence industry).

It is evident that the concept of national sovereignty, although it has been revised, still exists in matters related with defence. However, the situation that has been detailed here has motivated these players, the inter-

national and supra-national organizations of which Spain is an ally and member, to intervene in affairs.

The EC, in particular, has emerged as the new regulator for the defence market, a function that has traditionally been in the hands of the States. As has been stated by top civil servants on various occasions and been picked up by European Councils since 2012 – which have dedicated part of their meetings to defence issues – the EC continues with its objective of creating a truly single market in Europe for defence (EDEM).

The initiatives for pooling NATO and European Union capabilities can be defined as a change in the principles of cooperation and mutual support on which both organizations are based. They are taking place in an economic scenario that is clearly negative and which has a very direct effect on the defence effort that these organizations keep demanding from their Member States. However, what from a logical point of view seems simple is not so from what I would call a real one. The problem is far more complex, because what we are talking about basically is sharing an asset, defence. It is a public asset that is inseparably linked with national sovereignty, the provision of which is the unavoidable and non-delegable duty of the state, and is a variable that carries much weight in any issue that is related to the multinational management of defence. But, beyond that, the production of the goods and services needed for defence is, perhaps with the exception of those companies in the sector that are still state-run, a private activity and therefore has a major impact on the technological and industrial base of the defence sector and thus on the economy of a country.

The principles associated with the Smart Defence and Pooling and Sharing initiatives are definitely an innovative model. They have important implications in the areas of sovereignty, the economy, hi tech, the labour market, independence etc., factors that without doubt need to be very much taken into account when it comes to their conceptual development and later implantation.

Are we fully convinced that at a determined moment we can access military capabilities that we have earlier renounced as a consequence of the pooling process and which, therefore, have to be provided by an allied country? Do we fully accept that a solely financial share in the development, production and maintenance of a military capability, without any type of industrial return, will satisfy us? Especially in the case of countries such as Spain with an industrial capacity in defence that is not one of the biggest yet is far from negligible. Is there room for the concept of common financing for a military capability that does not take other aspects into account? That is to say financing and having access to a specific military capability, but without any sort of technological or industrial contribution? Is it appropriate in that common finance framework to allow

contributions in kind through means linked with the military capability that is to be covered? How do you evaluate these contributions and who will benefit from an industrial point of view?

Nevertheless, returning to the reality that was mentioned earlier, there is also room for other questions. Are we fully convinced that Spain on its own can face up to the present and future resources for acquiring all the military capabilities that it needs to cover the threats against it? What will be the consequences for a country that decides not to play an active part in the pooling processes of both organizations, NATO and the European Union? Will the identity crisis that Europe is suffering as a global player end up with, as has happened with similar crisis situations in the past, Europe having a negative effect on those countries that have stayed on the edge during this period of «stepping into the wilderness»?

The continual tracking of the changes in all the initiatives currently under way and of the many facets that stem from them should be a priority task for the Ministry of Defence in Spain, especially for the Secretary of State and the Directorate General of Armament and Materiel. This includes all that is connected with issues regarding the defence industry and market. Together with the Spanish industrial sector - individually and through its associations, TEDAE and AESMIDE - they will need to work very closely and in coordination to ensure the most positive impact possible of the changes that are drawing nearer, both on the Armed Forces and on the sector. Because for as much as we may want to cover our eyes, those changes will come and will happen with or without us. That is why the international dimension in matters connected with armaments and materiel is growing ever more relevant.

The way in which we get involved in the expanding process of planning military capabilities at a multilateral level; the weight of R&D and innovation investment in the development of military capabilities at both private level by the industry and state by the Ministries of Defence and Industry; the rhythm at which Spain moves towards the commitment made in Wales for defence budgets to reach 2% of GDP, including a serious commitment to the stability of these budgets; the launch of new programmes for modernizing the armaments and materiel of the Armed Forces, either through international cooperation or at national level; the competitiveness of the Spanish defence industry and its export capacity; and, of course, the final size of the companies that emerge from possible mergers to make them more able to take on a market that is ever more global and competitive - all these will be factors that determine both our military capability and our future industrial capacity and, therefore, the weight the country has in the area of defence and in international relations.

The acquisition of systems and their financing: problems and some solutions

Antonio Fonfría Mesa

Chapter five

Abstract

This text it is to present the main problems found in the way of purchasing weapons systems from an economic and financial perspective, from the point of view of supply and demand. In addition, it will try to propose some alternatives to guide the whole process towards greater economic efficiency. In particular aspects of the budget, recruitment strategies, forms of business cooperation, the problems of indebtedness, etc. will be discussed. All of this in order to present some alternatives and tools to reduce all social and private costs to which the Spanish procurement system faces.

KeyWords

Defence industry, defence budgets, procurement, costs, weapon systems.

Introduction

One of the weaknesses that has traditionally afflicted the way that defence is managed by the state in Spain is the lack of resources for it. As with other functions that are shaped by policies, like health, education, infrastructure etc, the necessities of economic, human and material resources have to fit in with the objectives set by the different governments. To this, it is pertinent to add a necessary continuity in certain policies of state such as foreign policy and defence. This factor means complying with at least two premises. The first is to maintain a coherent and consensual long term line on activities, image, positioning, compliance with commitments and participation in international organizations; which is to say outlining the level of ambition that the country wants to reach. The second question to be complied with has to do with equipping with the necessary resources to reach that level of ambition. From the combination of both aspects comes the order of priority of a policy within the range of those that a government has to carry out.

In the case of defence policy, as will be seen later, its position in the order of priority has been considerably lessened since the 1990s. This means that the budget assigned to it has become very scarce, which has obliged the government to resort to alternative forms of financing. On many occasions these have suffered from a lack of transparency, coherence, simple interpretation and efficacy in execution, as is demanded of a budget.

This situation has combined with the growing need for a suitable response to risks and threats; that is with all the resources necessary to take them on. Among these resources should be highlighted the economic and material ones¹. With regard to the former, the budgetary approach, as mentioned before, is insufficient to get a correct awareness of what is actually being spent, which has implications when translated to the latter aspect, the material one. The material necessities, basically highly sophisticated technological and complex arms systems, are one of the basic pillars supporting the capabilities of modern armed forces. The problem arises from the difference between the money assigned and the material needed or, in other words, the lack of financial resources to fund increasingly costly systems.

The following pages will try to set out the main problems that have been found in acquiring these systems from an economic-financial perspective, from both supply and demand points of view. They will also try to offer some alternatives to guide us towards greater economic efficiency, particularly in the way things are managed.

¹ Obviously human resources have to be included, but they are not going to be analysed in these pages. A detailed study of human resources dedicated to defence in Spain can be found in Valiño (2013).

Current situation from the demand perspective

The budget

The budget reflects the relative importance or priority that is given by governments to spending policies, in a way that allows one to know up to what point a policy is more or less of a priority within the overall scheme. From this perspective, looking at Figure 1, the drop in value of the initial budget assigned to the Ministry of Defence is evident, as is its loss of weighting with relation to GDP and the overall budget spend. Taking a base value of 100, the initial defence budget for 2013 had fallen to nearly a half of its value in 1990. However, taking into account the final spend – without the consolidation of autonomous organizations dependent on Defence – the reduction that same year was of 38%.

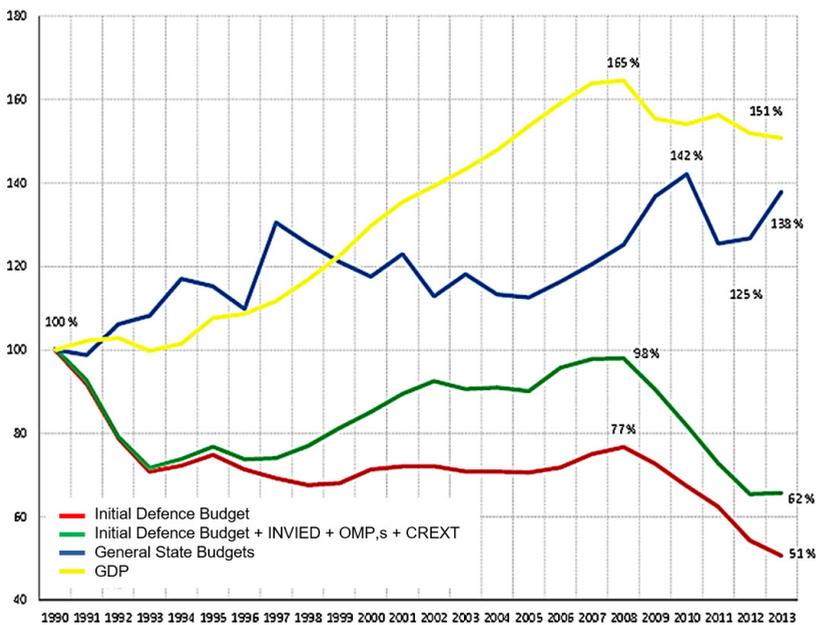


Figure 1. Comparison of the initial budget and the final spend on Defence with GDP and the overall budget spend. (Base 100=1990 and € of 2013). Source: Budget Office, Ministry of Defence.

Over the same period, the overall increase in the government budget was one of 38%, which indicates that the other policy areas have seen their allocations rise substantially. At the same time, GDP has risen by more than 50%. In short, defence policy is not a priority for governments for a variety of reasons that are not going to be set out here.

However, the most relevant part to the effects of the analysis is connected with the proportion of spend destined for the industrial sector, and that has two applications: current spend and investments. As is demonstrated in Figure 2, the spend on investment last year did not even reach 30% of that of 2000. The cut in current spending was less, basically because it is more rigid than investment. In 2014 the reduction in relation with the initial year was 15% of the value of 2000. In both cases the budget cuts do not respond to less necessity, as one might suppose, but on one hand to the position occupied by defence policy and on the other to the effect of the cuts in budget made because of the economic crisis that began in 2008.

In the end, a reduction in budget of this type implies a major fall in the operative level of the Armed Forces, as it produces leakage effects in other areas such as training, hours spent in the air or at sea, the maintenance of systems, acquisition of new ones, etc. Additionally, the effects of the budget cuts are accumulative, in such a way that recuperation will not come automatically with increases in spend but will need a longer time to get back to the levels it started out from.

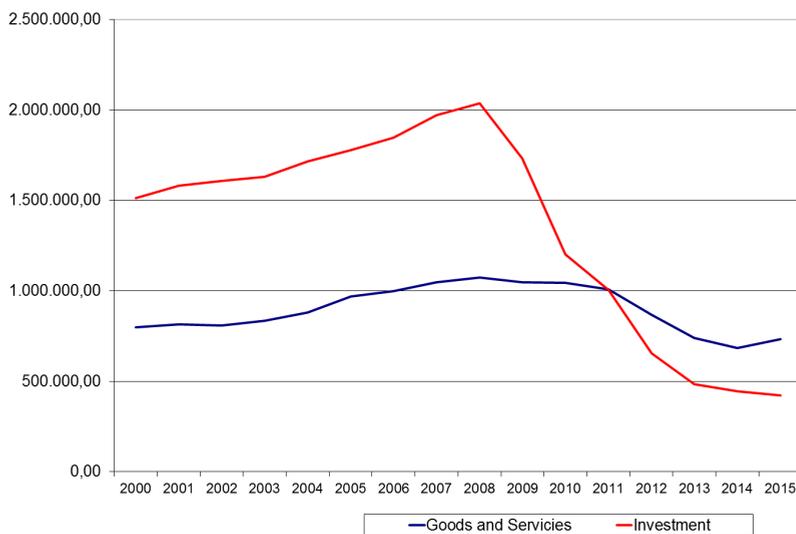


Figure 2. Evolution of current spend (Chapter 2) and spend on investment (Chapter 6). (In € of each year). Source: Compiled by author.

What is particularly relevant here is the lack of a time perspective that brings with it a certain guarantee on defence spending or investment, which raises various points to be considered:

Firstly, the lack of budgetary commitment tends to make it easier to reduce spending on investment – that is, with less resistance – than where there is a certain obligation (with the flexibility referred to earlier, as is clear).

In second place, the lack of money in the initial budget, which has to be topped up with additional amounts through the year, generates management problems that represent major costs, impose uncertainties on the definitive spend, limit planning on costs and investments. In short they reduce the rigour for planning on spend and, therefore, efficiency.

Thirdly, it needs to be pointed out that in not having an ongoing perspective for spending over several years it is not possible to carry out a policy that tends to make the most out of budgetary resources, nor an acquisitions strategy which is not restricted to the short term.

In addition, budgetary cuts have to be accompanied by the costs they generate. In other words, to make it clear what it is being abandoned for each monetary unit that is not being spent or invested.

Debt and its consequences

The lack of budget spend and its almost constant reduction has led to it complying with some of the laws of Augustine —Augustine (1984). This is particularly so where the cuts combine with an increase in the costs of arms systems, producing a substantial drop in demand for them and preventing an adequate supply of materiel to the forces. The response from countries in general, and in particular from Spain, has been long term debt². In the Spanish case, this has not been carried out in a very adequate way. On top of the insufficient provision in the budget has to be added the scarcity of structural financial capacity; the lack of planning on the maintaining of the multitude of systems that were acquired without consideration for their life cycle costs; the low level of rigour with compliance in many contracts – both on the part of contractor and client – and management that is fairly deficient and increases all sorts of costs.

Nevertheless, it has not been possible to abandon the acquisition of arms systems because of the need to have the appropriate equipment for the levels of security and defence that are deemed necessary. It is another question whether the equipment that is acquired responds to the threats for which they are seen as a solution. What is essential is to improve the whole of the acquisition process from start to finish, seeking to increase efficiency as a means to improving on how resources are allotted.

In any case, the form of financing carried out on the basis of refunding advances at zero cost - which the Ministry of Industry hands to the companies that are going to develop programmes for the Ministry of Defence via Programme 464B - can result in certain weaknesses in the financing

² Obviously international collaboration has also been a response to this situation, but this will be looked at later.

system that lead to an important level of debt, although these can be corrected in the near future. Standing out among these are the following:

- The percentage of the advance made over the price is, on average, higher than 70% and even 100% in some cases among the 19 principal programmes. This percentage is very high and has two effects. The first is that private financing is replaced by public financing, reducing the risk for the companies and raising it for the public sector. That is to say, there is a very high risk transfer³. While this may appear positive from a business perspective in the short term it can have a bad effect in the medium term and particularly in the long term. Secondly, it produces a «financial-technological» illusion in that as the companies do not take on risks with their own resources they may not be as efficient as they would like to be in the development of products. This generates warps that are then carried forward and limit their competitiveness in the future.
- There is no direct relationship between the proportion of financing given to a programme and the weight of its R&D value. So in reality what is being financed is part of the manufacturing process, which exceeds the criteria under which the credits should be given⁴.
- The overall payments made to companies by the Ministry of Defence (MoD) are calculated within the public deficit - as it is carried out against the delivery of the system -and has to comply with the emission of debt, which prejudices the general macroeconomic system. However, adequate planning based on a realistic analysis of investment costs in arms systems could minimize the economic impact and substantially reduce associated costs as will be explained later.
- As is shown in Figure 3, the MoD's commitments are clearly growing up to 2020 and will remain around 2 billion euros until 2022, when they will start to fall sharply. On top of this, a new investment cycle is starting that will require more economic resources and will overlap the current one. This will lead to an overlap in payments and therefore the need for more budgetary resources.
- The signing of agreements between the prime contractors and the Ministry of Industry does not appear to have taken into consideration a minimum of coordination between the payments and the deliveries of the different systems. This lack of coordination has led to having to make a high level of payments in very short periods of time, leading to additional pressure on the budget.

³ Note that in public-private contracts one of the fundamental factors for supporting the relationship between them is sharing risk. See Acerete (2004).

⁴ As has been pointed out by Fonfría and Correa-Burrows (2010), the use of funds destined for R&D in production tasks is part of the industrial policy developed by the DoD in the USA and is used by other countries, such as Spain.

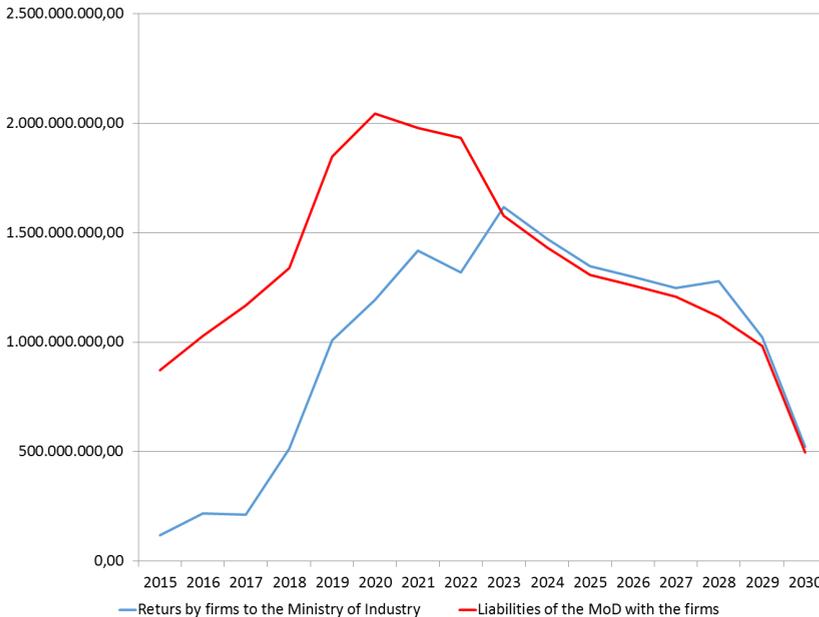


Figure 3. Commitments of MDE and companies.
Source: Ministry of the Treasury and Public Administration.

Not taking into account in many cases the life cycle costs of the systems – their maintenance, if you like - leads to substantial increases in the need for economic resources. In the worst of cases it can mean the lack of availability of the system in question, with its detrimental effect on security, and which represents a totally inefficient allocation of resources.

Lastly, at various times the MoD has had to renegotiate the way of making payments to the companies, as well as the time frames and the number of units to be acquired. This situation creates very negative effects. From the point of view of the companies it implies industrial and financial uncertainty, which is contrary to any criteria for supporting industry. It also results in the curtailment of a production series, that limits taking advantage of economy of scale and learning. This creates an increase in unit cost that, logically, has to be assumed by the MoD and added to the existing costs⁵. For the MoD, although there is a reduction in costs there is a reduction in capacities as well, with its effect on security. A realistic calculation on needs at the start of a programme would mean less costs from numerous perspectives - like those on the transaction, the financial ones and those stemming from inadequate planning – that systems have to drag along with them through their life cycles.

⁵ As Rogerson (1992) put it, companies have a lot of power for passing on increased costs in their prices, adding it to the budget. It is what the author called *cost shifting*.

Current situation from the supply perspective.

Structure of the defence industry

As is known, the defence industry is an oligopoly in which a limited number of large groups have an important market share, while a cluster of small and medium size companies (SMEs) basically play the role of sub-contractors or specialist suppliers when they have some sort of high value asset, such as a very specialized technology or know how. This structure is similar in nearly all defence industries in developed countries, albeit with different levels of oligopoly. In addition, in certain areas there is usually a tendency towards a natural monopoly, as in the case of shipbuilders in some countries⁶.

Another feature to emphasise is the strategic nature of the industry. The needs that have to be covered by the Armed Forces usually require a high level of technology in their systems, which means companies need to maintain innovatory and research capacities to match. This gives a lot of power to a market in which there are very few competitors at international level and, in many cases, none at national level.

From these starting points, the dynamics of the industry in the last few years could be resumed as follows⁷:

- Concentration has increased since 2004-2006. The 75% of turnover that was handled then by 10% of the companies was in 2013 — the last year for which information is available — handled by 6.9%. Market power, therefore, keeps concentrating in an ever smaller number of hands.
- Company profitability has historically been above the average for the Spanish manufacturing sector as a whole, which reinforces the idea of there being power in the market. Although the crisis has affected the defence sector, its profits on income were 8.2% in 2007 — 57% above the industry average. While this figure fell to 6.3% in 2010, the differential with manufacturers as a whole remained the same.
- International activity has been growing at the same time as the national market has been shrinking as a consequence of the budget restrictions. While in 2007 little more than 40% of defence turnover was from exports, by 2013 this had doubled, generating a clearly positive trade balance. As a result of this transformation in ex-

⁶ A striking aspect is the definition of what is understood as being the defence industry, which is not clear and needs a study to define the concept of its analysis.

⁷ All the indicators presented on this point are based on publications and reports from the Directorate General of Armament and Materiel (DGAM) except where specified otherwise. A more in depth analysis can be found in Fonfría (2012).

ports, the part the MoD plays has clearly changed as it is no longer the benchmark client in some sectors, but behind the Ministries of Defence of other countries. This situation brings some changes related with the power that the MoD could have in a monopsony market, that has to be replaced through the strengthening of other roles. That could be support for exports; acting as legislator, owner or shareholder of some key companies, or in financing R&D, as has been shown.

- The barriers to new entrants in the sector were high until only a few years ago. But the change towards the supply of dual use products is opening up the industry, although only in the segment of smaller companies, while the so-called prime contractors maintain their capacities and power in limiting entries. However, important changes being made by the European Union are putting in question the survival in the medium term of some Spanish companies that will not be able to compete in numerous areas with the big «national champions» of other countries.

Business collaboration

There are usually two arguments put forward when it comes to justifying collaboration or cooperation between companies in the sector, particularly at international level. The first of these is the reduction in budgets, especially intense in Europe, which leads to the need to create consortia that can supply a group of countries and not just their national market. The second argument has to do with supply, given that the technological capabilities of most countries are not sufficient to develop complex systems on their own. In this way cooperation has become a sort of last resort for both the companies, which are able to share costs and develop technologies and new business, as for the Ministries of Defence which can obtain higher level capabilities than could be aspired to in the national market.

However, the way in which the collaboration is carried out brings with it some very high transaction costs, reducing its usefulness in terms of results and the performance of the systems as much as it does in the possibility of cutting costs of acquisition. What also needs to be considered is that the companies may be disappointed if they do not meet their objectives on costs or the number of units sold. This would generate a significant reduction in income and profits or, in the worst case, both. As a matter of fact, the level of collaboration for acquiring defence equipment has been going down at a serious rate. The drop between 2011 and 2013 was more than 65% according to figures from the European Defence Agency (EDA). What is particularly relevant is the collaboration between the five leading countries in the production of weapons systems, the changes in

which are presented in Figure 4. On top of the general reduction that can be seen, one has to add in some examples of erratic behaviour, typical of isolated cases of high volume, which present a far from stable pattern of collaboration.

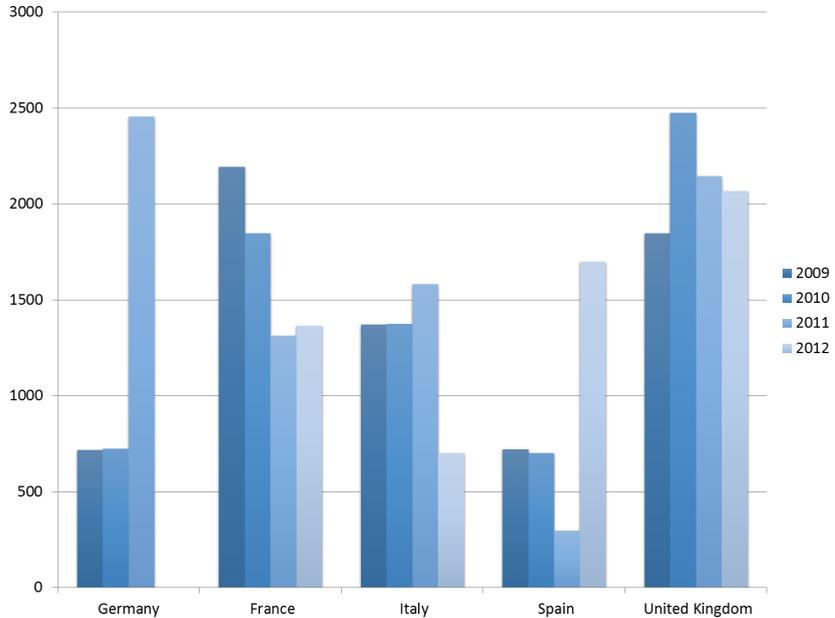


Figure 4. Collaboration between the big five on the acquisition of defence equipment (in millions of Euros). Source: Compiled by the author from EDA data.

Changes in technology and the emergence of SMEs

The technological systems for military equipment after the end of the Second World War were a closed market with major barriers to newcomers. Public companies had a big role and the big private ones produced many of the technological innovations which had military use and civil applications in many cases. However, from the end of the 1980s onwards there were big changes in many sectors with what had been key technologies for defence starting to be developed for civil use. In many cases this was carried out more by smaller companies than the large producers of traditional technology. This double change produced positive aspects but also new risks for both the industry and clients. On the positive side, it is worth highlighting the following:

- A tendency to cut production and acquisition costs on an important range of dual use technology, an area of significant scope at a time of budgetary restrictions.

- The production of technology by SMEs that are not linked to the defence sector leads to an increase in competition. This tends to reduce costs, which leads to less budgetary pressure.
- As they do not have much power in the market, the SMEs' capacity for negotiating is usually much lower than that shown by the traditional defence contractors. As a result, mature technologies or new solutions can be obtained at lower prices.
- Contracting with this type of company usually involves lower transaction costs than with larger companies, on open contracts or advertised ones.
- As the technologies are on the market, they do not need so much financial effort on R&D from the MoD as before, so the part paid for by the Ministry of Industry can be reduced.
- As far as risk factors are concerned, these can emerge from the changes mentioned. Among the most relevant ones that affect the acquisition and financing of technologies and systems, but not the large platforms, are:
 - The risks linked with security in the supply chain for spares, parts and the updating of systems. Given that the average lifespan of SMEs is less than that of the large companies that have traditionally cornered the defence market, the probability of them disappearing is relatively high. This leads to a certain reticence when it comes to buying similar systems – at lower prices – from smaller companies⁸.
 - Ministries of Defence lose part of their control – in some cases all of it – in the development of technologies, including over the path that the R+ D could follow.
 - The requirement levels for defence systems in the settings that they have to operate and the standards that are demanded are usually a major barrier – whether it is necessary or not - to new companies. For example, the need for some systems to be able to withstand extremes of temperature that are not asked for in the civil market can be seen as a barrier to entry, where the demand is reasonable or not. In a way, it can be used as a sort of protection against new entrants.

These aspects delve deeper into the big changes that have taken place over the last few decades. They are responses that are given from the supply side and which have a strong effect on demand. The spectrum of acquisition options widens, companies seek increasingly complex niche markets, and the need to adapt to the changes is more of an asset associated with smaller companies than the big ones. In many cases these

⁸ This situation could occur even within the legal framework, as with Spain, which gives special attention to the lowest price above other considerations in the case of public purchasing. See Nogueira (2009).

SMEs are the result of university spin-offs or even people who came from the big companies. This gives them an extra added value as they already know the sector and are capable of responding to its needs.

Efficiency problems

From the market perspective, the efficiency of an oligopoly or a monopoly, linked to a monopsony, leaves much to be desired when compared with a standard case of perfect competition. Making the most of a position of greater or lesser dominance, and therefore the possibility of influencing prices, produces from the supplier point of view a reduction in the consumer's welfare. However, if the consumer is a unique one the problem is double, given that there are incentives for a certain level of «collusion» between them, in a way that the benefits may not be reflected in a greater social welfare. It is credible, therefore, that a market with big imperfections, both in supply and demand, can generate equally important inefficiencies. Among these are the following:

- Traditionally, the different forms of contracting have not been a stimulus for efficiency on the part of the contractors. For example, cost + fee contracts stimulate inefficiency in that they do not penalize increases in costs. It happens when there is asymmetry in information. Ministries of Defence do not usually have a reference to the costs of production beyond what is actually regulated, where there are incentives to provide distorted information on costs. This situation leads to a search for solutions that, in the case of Spain, involves the setting up of a Cost Evaluation Group. Its mission is to control and evaluate the costs put forward by the companies for the most important programmes.
- The use of contracts like those that are negotiated without being advertised – very useful in many cases – or those based on competitive dialogue, are less efficient than open competitions, more still if there is international competition. Although aspects connected with security of supply are a limit that is usually laid down by Ministries of Defence, it is important to highlight that budget restrictions have altered the MoD's behaviour. If one looks at the volume of open contracts compared with all MoD contracts in recent years, it can be seen that in 2008 they represented around 5% of the total, while in 2011 they were 46% and in 2014 at a similar level, 44%⁹.
- Market power, especially in the case of monopolies, is not a stimulus to gaining in efficiency. This can be expressed in two ways.

⁹ The information referring to contracting is based on contracts published in the Official State Bulletin (BoE.) See Fonfría (2012) and Soriano (2015).

On one hand, the power that comes from having a captive client which only acquires systems from one company can mean a low level of income but be a big pressure factor. On the other hand, the technology the company has is another key factor in maintaining that market power, even if it is not state of the art.

- A factor that generates inefficiencies is the changes requested by the client during the production process. These are usually outside the terms of the original contract and produce increases in costs that are accompanied by changes in systems or sub-systems, which means the company has to make changes to its manufacturing system. An example of this is *gold plating* linked to technological changes¹⁰.
- Another source of inefficiency is the sort that stems from the principal-agent relationship. In this case, their objectives are not in tune and problems arise from asymmetric information. In this way, the principal may not have the full information the agent has and takes on the extra costs. This situation leads to problems of moral hazard and adverse selection. The first of these occurs when the contractor takes risks where the costs will be assumed by the client. It is a typical case where new technology is involved.¹¹ With adverse selection, the Ministry of Defence in question does not have the capacity to know, before signing the contract, the quality levels of the systems on offer.

Some solutions

While putting forward the main problems from supply and demand sides in the area of financing and costs, what is also needed is some solutions. It has to be said that a unique solution is not feasible and that the best result comes from a pooling of separate ones that affect different aspects and are compatible. Some of the proposals take on the financial problem directly, looking to lighten the load in the medium and long term. Others are targeted at making changes in types of management and even in the acquisition of the systems. What is important is to look at the whole scene, to be capable of applying remedies to the different aspects. Many of these are already in use in other countries and, although automatic copying of them is not possible in many cases, they can serve as a point of reference and reflection for Spain.

¹⁰ See the work of Martí (2015).

¹¹ A clear case of this is the technology that they want to incorporate in the S-80 submarines, the air independent propulsion (AIP) system, which could not be incorporated in the first of the vessels.

Adequate financing

It is not necessary to stress the lower political priority and the decrease in financing that can be seen in the MoD's budgets over the last decades. Just the same as it is not necessary to underscore the problems this has created in terms of training, maintaining capabilities, security levels, etc. Regardless of NATO's call to member countries of the Alliance to push their defence spending up towards 2% of GDP, and being realistic about the possible scenarios, the chances of this happening in Spain does not appear likely.

As is illustrated in Figure 5, there are four parallel projections, split into pairs. They are based on the initial budget - clearly the ones in the lower part of the graph - and on the actual spend that was carried out. Taking into account different scenarios based on an average growth in GDP of 2% during the period 2015 to 2025 and two variations in the growth of the overall state budget and spending on defence, the results show spending on defence being lower than 1% during the decade.

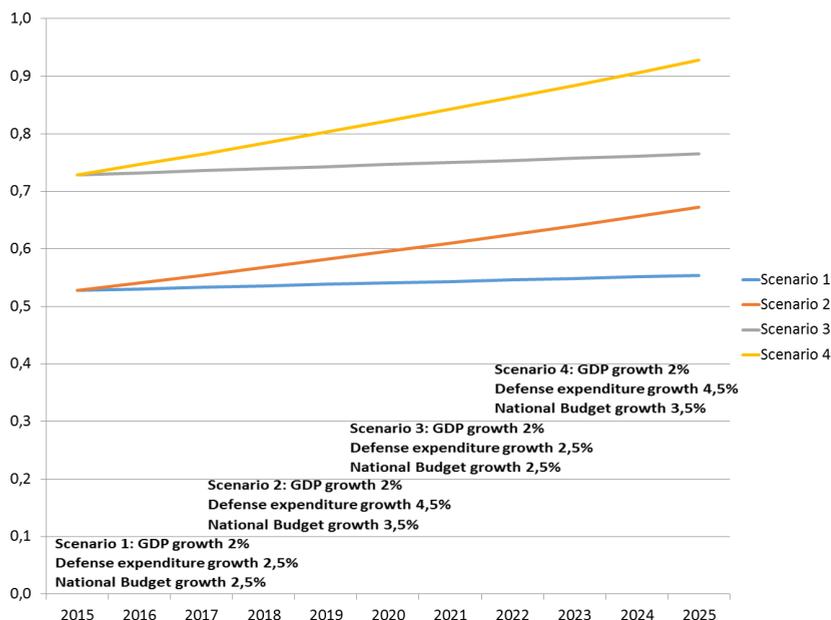


Figure 5. Defence Spending, as % of GDP. Projections for different scenarios. Notes: Scenarios 1 and 2 are based on the initial budget; scenarios 3 and 4 on the final spend. It does not include the budgets of autonomous bodies dependent on the MDE. Source: Compiled by author.

Given this situation, the question has to be asked whether it is possible with the changes to face up to the costs and investments required for the types and quantity of arms systems that will be needed during this period. Added to this are costs that are already starting. For example, pre-financing on the F-110 frigates, agreed by the Ministry of Industry for 2014 and 2015, had reached approximately 211 million euros by June 2015. If pre-financing on the 8x8 armoured vehicle is added in, another 89 million euros, and what is destined for other programmes in the coming years, the situation will soon be similar to what it is now. An accumulation of debt by the MoD and high amounts of pre-financing on the part of the Ministry of Industry tend to reproduce the vices of the past.

What is needed is moderation in the pre-financing. In this way, the volume of resources destined for returnable credits at zero rates has to be linked with a percentage limit or similar that takes into account the size of the programme, the financial capabilities of the contractor, the proportion of R&D in the overall programme, and the level of shared risk. In other words, the contractor should not receive 100% of the value of the programme, as has happened in numerous cases, but should share risks with the MoD, which would be a stimulus for the efficient use of resources. Also, the MoD could be the technological partner of the contractor – even intensifying this role and broadening it out to a larger number of contracts – so that it shares in the profits that could come from future exploitation of the technology that is obtained.

Another way of adapting financing to necessities in the medium term is through a law on investment programmes. The reticence in putting forward this possibility is based on the limitations for getting commitments on long term debt. However, the result is similar to that produced in ordering four submarines, 14 strategic transport planes or any other system. The difference is in the base it starts out from. If it is less rigid, another possibility can be found in the Strategy for National Security – or other appropriate document – using approximate percentages that serve as a guide for all the spending on investment. This is usually the way it is done in other countries, for example France.

Lastly, it is appropriate and necessary to include in the overall state budget the total spend foreseen for that year. It does not appear to answer the criteria of transparency or efficiency in how the spend is managed if the whole of the budget items are not included with an estimate on value that is close to reality. As a matter of fact, figure 6 shows that the worst estimate of spending on defence in Spain is the initial budget, when compared with the calculations made by different international institutions.

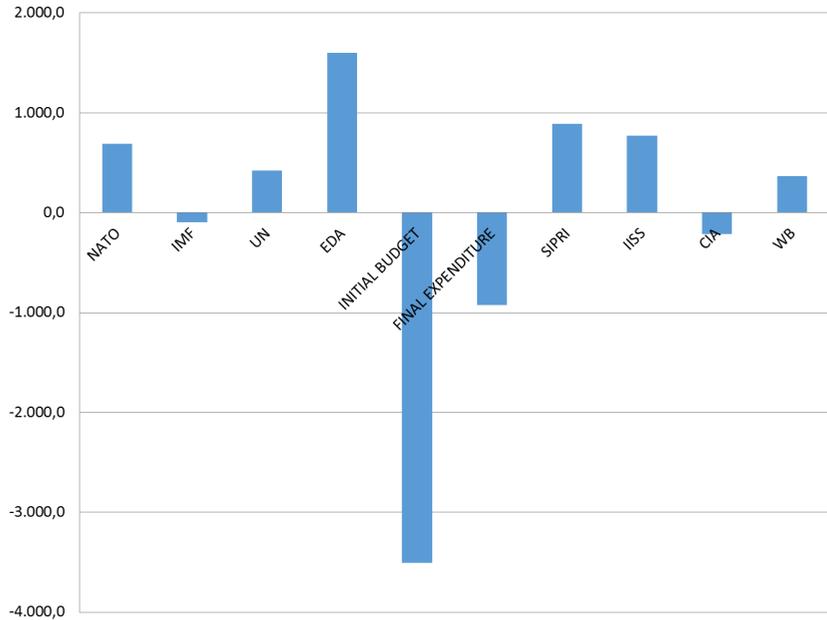


Figure 6. Average deviation for the period 2003-2011 on the estimates of defence spending by the institutions (in constant \$ of 2005 in PPC). Source: Fonfría (2013).

Obtaining capabilities

Obtaining capabilities means looking for, at least, three key aspects: selecting the system to be acquired, estimate the costs and time needed to get it running – its entry into service – and the acquisition strategy. An inadequate approach to any of these factors will produce big problems in cost over-runs¹² that will be dragged along throughout the process and will tend to accumulate.

The problems of moral hazard and adverse selection play an important role in this process. To avoid situations like this as far as possible, the level of competency should be high, such that the technical characteristics of the products or systems are sufficiently clear to the buyer and that the price and time should be the key factors to consider. It is necessary, therefore, to have a realistic analysis done on costs, that provide an ap-

¹² When talking of cost over-runs, these include economic ones and those derived from increasing the time that it takes for the Armed Forces to be able to use a system, compared with what was planned initially. That is to say that time has an economic value in the lack of operability of the system in question. Or, to put that another way, the delay implies lack of security, the result of the system not being operative to cover certain risks.

appropriate estimate for the whole of the acquisition process, getting it into service, maintenance and withdrawal of the system, avoiding optimistic slants and getting involved in high transaction costs. The problems of a buy-in linked with an under estimate of costs and an over estimate of the benefits can be seen as being unrealistic as the elaboration of the plan progresses. They can then be controlled through time and cost management based on the initial forecasts to avoid the problems being dragged through the whole process¹³.

One important problem is the lack of rigorous analysis and of communications between the contractor and who will later have to carry out the programme. Several tools have been developed to avoid any false starts. Among these should be highlighted some that have been developed in the USA, such as Deducing Economically Realistic Implications Via Engineering (DERIVE). The goal of this type of instrument is to apply a work methodology based on «traceability» in the acquisition of specific systems, looking at various aspects of the programme such as its performance, technical and economic factors, and the technical demands needed to reach set objectives, as well as avoiding problems during the development stage¹⁴.

Equally, it is hoped that the time process for receiving the product is cut, so that the systems and technologies that are available at the time of the contract being signed do not have to be upgraded once it is under way. This can include modifying the first units due to their obsolescence at the point of entering service, as has happened in quite a few cases. To avoid this as far as possible, it can help to measure the level of technical maturity, or Technological Readiness Levels (TRL). This system was developed by NASA with the goal of quantifying the levels of readiness and comparing them. It permits a reduction in technological risk and, consequently, in possible costs that may be linked to this¹⁵.

Contracting

In 1983 the British Ministry of Defence introduced a policy of competitive contracting with the aim of getting the best value for money possible from their acquisitions. In 2005 they took another step with long term strategic accords with the main contractors. Later, in 2009, an independent analysis of the Ministry's acquisition policy showed it to be prohibitive, with the number of units too high and too many specifications. In the three cases

¹³ See Martí (2015) on this.

¹⁴ An example of the use of this system can be found in Patel, Gillingham and Sparrow (2013).

¹⁵ See the seminal work of Mankins (1995).

the strategy for contracting was different, using different types of contract and with advantages and disadvantages that were also different¹⁶.

When it comes to deciding on strategies for contracting, various objectives and not just one have to be looked at. The tendency in the case of Spain – as defined in the Public Sector Contract Law – is to see the price as the key variable. While it is true that price is a fundamental factor in a contract, it is not the only one. Here again time is a prime variable.

In general terms, there are various types of contract based on the values that are taken by α and β in the following equation¹⁷:

$$P = \alpha + \beta C$$

P is the price of the contract, C the costs incurred by the contractor, α the margin fixed by the government or negotiated with the company and β a proportion over the costs. It depends on the type of system that is being acquired as to which is the most appropriate form of contract. As an example, the contracts for systems where the level of technological uncertainty is high - as usually happens in many of the main programmes – the refunding of costs is usually the best way.

Contract	α	β
Fixed price	>0	0
Reimbursement of costs	0	1
Fixed more incentive cost	>0	1
More incentive cost	0	>1
Cost (aim) more incentive	>0	<1

Chart 1. Types of contract with relation between price and cost. Source: Martí (2015).

A second factor to be looked at in the area of contract strategy, one which tries to improve the efficiency of the system, is the duration of the contract. When dealing with complex systems that can have different delivery times – as, for example, with aircraft arriving on set dates – it is necessary to define whether to have a single contract that runs over several years in keeping with the delivery dates or to have annual contracts. Equally, there can also be a mix. In which case is one structure of contract

¹⁶ A thorough analysis of the decisions taken by the British Ministry of Defence can be found in Hartley (2011).

¹⁷ With this aspect, see Hartley (2011) and Martí (2015).

better than the other?¹⁸ The answer to this question depends on various parameters, among which are the following:

- The opportunity costs for the buyer in terms of less flexibility on multiple year contracts compared with annual ones. In reality this situation limits the possibility of other acquisitions in the future, leaving less room for manoeuvre.
- Multi year contracts can limit the possibility of the buyer renegotiating for later lots. If two or three lots are negotiated over a time period of five to seven years, independent of changes in costs, quality and delays, it is extremely complex to renegotiate prices, something which is much simpler in the case of annual contracts.
- In general terms, multi year contracts are more appropriate in cases where the technical requirements, the design and the financing are stable and realistic estimates have been made on the costs and savings of the contract.
- Annual contracts have the virtue of being able to make use of new information to negotiate for the following year, in this way improving the position of the buyer.
- On the other hand, the contractor will find more advantages in the multi annual contracts as they guarantee stable finance over the medium to long term and limit the negotiating margins of the buyer.
- Obviously the multi annual contracts usually offer a better price than annual ones, which can also benefit the buyer.
- However, the transaction costs involved in annual contracts are usually higher. That does not prevent a possible strategy of having a multi annual contract followed by a number of annual contracts as being the best way. The choice here on both the number of years and the number of contracts will depend basically on interest rates and, therefore, the opportunity costs of financing and the level of inflation.

In reality, the key question from the perspective of a Ministry of Defence is how far they can secure savings or returns from the different strategies. If the transaction costs go very high, taking out annual contracts can erode the savings from a better knowledge of the costs, which could be reflected in lower price levels.

Costs

This is a path with plenty of room for improvement, although experience says that the complete elimination of over-run costs is not possible. In general terms, in practically no country has it been possible to totally

¹⁸ See the work of Arnold and Harmon (2013) for an in depth analysis with different scenarios. For a specific case, such as with the F-22, you can consult Nelson et al. (2006).

control increases in costs and delays in the delivery of systems. In the case of the USA, for example, the government has not had much success in controlling cost increases and the blame can be shared half and half by the Ministry itself and the contractors¹⁹. Some examples can be found in Chart 2.

Programs	Type	% Increase in cost	Delays (in months)	Percentage without running (2005)
Aerial Common Sensor	Airborne C4ISR System	45%	24	85%
Future Combat System	Land combat system	48%	48	78%
F-35 Joint Strike Fighter	Joint Force fighter aircraft	30%	23	60%
Expeditionary Fighting Vehicle	Amphibious assault vehicle	61%	48	49%

Chart 2. Costs and progress on some US programmes 2005. Source: Ortuzar (2008).

In the case of Spain, the increases in costs are also high and have been used on various occasions as a motive for renegotiations by the MoD with the contractors, as was mentioned at the start of this text. Obviously there are big differences in the increases in costs between the various systems. Part of this is due to different types of management, from the conception of the project to it going into service. In other cases it can be connected with whether the contracts are linked with the maintenance of the system. But what interests us now is those that are related to the contracts. According to the Evaluation of the Principal Armament Programmes, presented by the Secretary of State for Defence (SEDEF) in 2011, the cost increases in systems are basically connected with three types of questions contained in the contracts: the contractual changes that take place, which represent about 45% of the cost rises; those that derive from revisions linked to costs and various other prices, estimated to account for another 42%, and, finally, the remaining 13%, that are open items²⁰.

The control of these items in contracts is vitally important, where possible, to avoid cost increases. That is why there is a need for strategic

¹⁹ An analysis of the problems the US administration has had with controlling costs on acquisitions of defence systems can be found by consulting Watts (2008).

²⁰ Open items cover aspects that cannot be defined exactly at the time when the contract is signed. Obviously, the amount of them, to a greater or lesser degree, introduces a level of uncertainty over the final price.

planning on all types of contract to minimise any deviations from the agreements that were signed. This includes a realistic assessment of the number of systems to be acquired, as what happens with a reduction of them during the production process creates problems for the contractors. If this results in a rise in costs they will try and pass them on to the buyer, with the consequent effect on the costs of acquisition and the final price of the system, and will be a new source of financial pressure.

In this respect, having a group for Evaluating Costs is a useful tool. Extending their activity to cover all types of contract of a certain size, following the costs and checking on the possibility of correcting them in the short term is a high added value tool for getting the system to work better via cost cutting.

Additionally, it is necessary to include in the overall costs those that are linked to the life cycle of the system²¹. It is here where the problem of calculating these costs arises. Although there are various models for doing this, the most appropriate way is to look at at least two basic parameters: the uncertainty and sensitivity to the different changes or scenarios that are possible. An adequate evaluation of these costs will substantially reduce the financial problems of any programme.

Efficient collaboration

The problems with collaboration between companies – and countries – in acquiring arms systems have been set out earlier. However, this can be a good way of obtaining necessary capabilities at a relatively much lower cost than developing a product on one's own. This alternative becomes more important and attractive the more a defence budget is restricted, the greater the need there is for complex systems, and the higher the technological level of the sector involved.

When dealing with this subject one tends to associate cooperation with international collaboration, but it is equally applicable between companies in the same country. Restrictions arise in the technological field in the case of Spain as it does not have some of the necessary capabilities for the systems it requires²². The main obstacle to making the most out of collaboration lies in the way it is done. It is important to look at various aspects that tend to reduce its usefulness, mainly through increased costs. Standing out among these are:

²¹ According to various studies by the Government Accountability Office in the USA, the split in the costs of a system is around 40% on production and some 60% on the life cycle.

²² This is the case with the AEGIS system that is installed in the F-100 frigates, and which originated in the USA.

- The ways of negotiating within a consortium of companies, as they have developed up to now, create a lot of transaction costs that tend to reduce substantially the profit that can be made²³.
- It is necessary to give certain aspects priority over others. The rule of fair returns creates efficiency problems that are difficult to justify, ones that are linked to policies that have nothing to do with the actual design of the system. As such it is usually used as a sort of employment policy, creating poles of regional development etc. The problem here is that it would be clearly reflected in increased costs for the MoD, ones that would be a benefit for the rest of society and are not compensated in any way.
- Each of the business partners in a consortium has to put a value on the competitive advantages it has and which benefit the group as a whole. There is no sense in duplicating or having superfluous installations or production activities when it comes to covering percentages of participation and production if this creates big inefficiencies that take away the value of the actual concept of collaboration.
- Supposing that they comply with the rules of the root of n ²⁴, it is equally important to select the right number of members to maximize the potential benefits of the consortium. As is reflected in Figure 7, as the number of partners/number of years rises the earnings tend to stabilize, due to the increase in costs of related transactions.

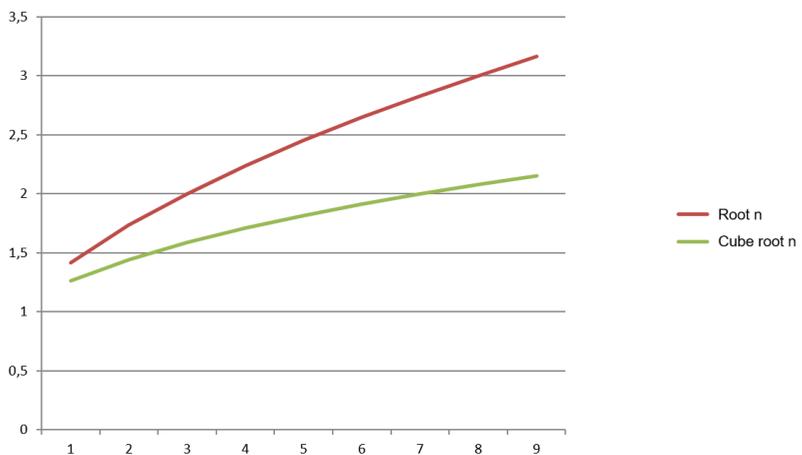


Figure 7. Estimate of the reduction in costs according to the rules of the root of n .

Note: The vertical axis expresses the change in the costs of production and the horizontal one the number of partners –in the case of the root of n - or the number of years- in the case of the cubic root of n -. Source: Compiled by author.

²³ The definition and analysis of the different transaction costs and the economic importance of the concept can be found in Williamson (1975).

²⁴ These rules, widely applied in different engineering areas, relate the evolution of costs to the number of partners or the number of years of collaboration.

Pending payments of systems still under development

The so-called Defence Debt is a big dead weight that it has been dragging along for years and will keep generating a large number of financial and budgetary dysfunctions. As has been expressed earlier, the latest renegotiations to be carried out have pushed the horizon for payment back to 2030, due to the impossibility of settling the larger payments in less time. The scarcity of adequate finance, the lack of prevision over payments in the future and the inexistence of any realistic financial prospects with a certain commitment of compliance are the main problems that have led to this situation.

With this scenario, there is no single solution that is agreed upon by the different stakeholders who are involved. There is not even agreement on the way the existing norms should be applied. While it is certain that a solution needs to be found, perhaps it is even more necessary to not repeat the same errors, by using some of the alternatives discussed earlier. Renegotiation is, as has been said, the most widely used way of alleviating financial pressure. Along with it, and complementary, another measure has been put forward that could be analysed. That is compensation on rights and obligations between the public sector and the companies. This solution, which is technically possible, needs only a political agreement to carry it out and a request from the contractor for its application.

The potential of this instrument lies in that it has no effect on the debt or on the public deficit, given that it does not require the creation of new assets to be financed. As a measure to be complied with on an annual basis, its impact on the financial situation at the MoD is important and would help to substantially ease its debt position.

A second option, which is currently being weighed up in France, is a privatization mechanism for military assets. It involves selling off assets – transport aircraft, for instance – to companies that are specially set up for the job and which then rent the assets back to the Armed Forces. This situation enables the public deficit to be cut as the payment made for the use of the equipment is treated as a running cost for carrying out a service. The companies set up to do this have to obtain funds from different sources, ranging from the sale of buildings to licenses and industrial shares in the public sector, etc. In the end it will be the public sector itself that will be doing the financing.

However, while the ownership of these companies can be public, private, or mixed, the key question is where they are going to find the funds so that they can finance the acquisition of the military systems²⁵.

²⁵ It is clear that if there was an adequate financing of defence, these types of activities would not be necessary. As a matter of fact, it would seem more logical to increase the

In the case of Spain, one possibility would be to set up an Acquisitions Agency, legally constituted as an autonomous organization. Through income generated by providing services and various sources of private and public financing it would acquire the systems that would then be rented out to the MoD. However, this is a long term process and would require analysis on what would be the best legal form for it to be able to operate²⁶.

A third alternative for financing would be for the MoD to lease the arms systems²⁷ — a serious possibility through public-private collaboration agreements. This mechanism would involve the MoD signing a contract to hire a number of systems – battle tanks, for example – during a set period of time and then returning them, with the option to buy them. In the case where there is no option to buy, or it is not exercised, the provider could then offer a new leasing agreement or sell the product to another country. In this case it is the contractor that runs most of the risks, if it is not able to relocate the assets. However, if production is geared to pooling demand – bringing together the needs of various countries – it could meet a high level of demand with a relatively low number of units while implying a substantial drop in the volume needed. This would be possible by finding out the compatibility of the demands of each country involved and how long they needed the units.

This option would mean the MoD needing far less financial resources than it does for direct acquisition. What is more, if it later decided to buy some of the equipment, the payments made up until then could be taken into account and result in a lower cost for financing from there on.

Centralization in the management of programmes is also usually wielded as a factor for improving efficiency in the acquisitions system. Views on this vary a lot. Views on this differ substantially. Analysed from the point of view of the Armed Forces, they see a decrease in their decision and management capabilities and of their needs as the user. The centralization body, on the other hand, looks more at arguments linked to generating economies of scale or improved efficiency. The steps taken in this direction so far have been moderate, basically because of aspects over power sharing. However, centralization can and should be given an important part to play, so that the armed forces will have the capability to manoeuvre in the acquisition process in their role as the user.

There has to be a stable balance in the process, just as has been happening for decades. Stability is a virtue for the system and inclines towards

defence budget to cover the amount of these needs.

²⁶ Another option would be to set up a public company operated like a private entity judicially to give it greater flexibility.

²⁷ This option is different from that carried out on the fleet refueller Cantabria with Australia. The leasing operation in that case was a way of demonstrating the ship so that NAVANTIA could later sell them a similar one.

producing deep-rooted and assumed protocols that in the medium term will generate big savings and reduce dysfunctions between the different institutions.

Conclusions

The financing of systems required by the Armed Forces is one of the biggest «Achilles' heels» to be found at the MoD. It is so true that it has produced a big imbalance that has spread into different actions, which go from the need for annual approvals outside the initial budget to pay supplier companies to extending the horizon for payments and reducing the number of units to be acquired.

Every time a solution is sought for this situation, the first is to increase the budget to cover what is really spent by the end of the year. It is true that society's view of the activities that are carried out is much less than the inclusion of the real expenditure in the initial budget. However, it is necessary to have a definite initial budget. This is the first premise for the effective management of public money.

But this is not the only option that is open. Other possibilities have been looked at in these pages relating to five fields of activity that are regarded as basic. They are:

- The way of obtaining capabilities, which is based on three key factors: the appropriate selection of the system, the costs involved in this, and the time factor, which should be approached as another cost to consider and evaluate.
- The type of contract to choose, particularly where it concerns the duration of the contract and which is the most appropriate for systems that require payments over several years.
- The reduction of costs through stricter control of certain sections included in the contracts and that usually produce the biggest part of the increase in the final price.
- Business collaboration, between national companies and internationally. In either case collaboration should be seen as a tool for improving costs and the efficient running of companies, an instrument that replaces the market in certain cases.
- Strategies for reducing the financing costs on outstanding payments and on future systems with various alternatives. In some cases this will involve a big change in focus and substantial modifications to some structures at the heart of the MoD, or even the creation of some that are external.

In the end, while there are not many new options, it is certain that a different approach to some of the classic questions could produce a big

improvement in the management of resources and less pressure on the financial resources of the MoD.

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Defence activity as a source of wealth

Máximo Blanco Muñoz

Chapter six

Abstract

The international outlook for European industry requires a radical change in mindset and policies by building a European political project in this area.

In Spain, the defence and security sector is no stranger to the traditional deficit that accompanies the development of the industry and that is reflected in the current structure of the industrial fabric, the capabilities of human capital and technological development that accompanies it.

The Spanish industry is creating conditions to try to adapt to the new world situation. But to take effect, you must bet on the strengthening of the sector and of the activities with the greatest potential for innovation and productivity.

In this context, it is important to consider investing long-term strategic criteria: an industrial base based on R & D; the sources of funding, public and private; changes in the training system for professionals in the future.

Keywords

Defence, security, industry, R & D, trade unions, Comisiones Obreras, globalization, peace, employment, BRICS.

Introduction

For some years now, the federations within Comisiones Obreras (CCOO), linked to its different industrial sectors, have been calling for specific actions on industrial policy. Before the crisis, because the strong competition brought about by globalization demanded that Spanish industry adapt to the levels of our neighbours if they wanted to play a role in the global market. And during the crisis, because it was essential to preserve the emerging industrial fabric if we did not want to be excluded from the process of change that was taking place in the developed countries.

Meanwhile, with or without crisis, we keep banking on substantial changes in the industry of our country, targeted at the desired production model that will put us at the same level of production, technologically, and in competitiveness as the rest of the economies with which we share a framework of economic growth and of welfare state. Changes that are reflected in the transformation that is happening with the displacement of the global economic hub towards the Asian side of the Pacific and where the biggest part of industrial production is being provided by the countries known as the BRICS¹.

The pattern for growth and reindustrialization, the energy model, the increase in the intensity of knowledge, remain the matters pending for the Spanish economy to tackle. In this setting, it is necessary to highlight the capacity of the defence and security industry when it comes to generating wealth in economic and national security terms, as well as in the areas of innovation and hi tech, which would make it a key piece in the industrial framework of any country.

That is why we cannot look on passively at the disappearance of industrial capabilities and massive losses of jobs, qualifications and competencies being suffered by the defence sector, in spite of the many efforts at regional and industrial reorganization that are being made.

For the trade unions, especially CCOO, the goal of the defence industry is to supply the Armed Forces with the systems and services for maintaining and promoting peace and security, as well as the capacity to cooperate in the European setting.

From a social and political point of view, there are four important aspects relating to the need for effective defence capabilities that stand out: protection of the population, the need to have well equipped forces, employment that is stable and predictable, and well thought out humanitarian and military activities.

¹ The emerging countries that play a crucial role in economic development, with major influence on the transformation of the world economy, are Brazil, Russia, India, China and South Africa. Some of these can be seen as no longer emerging.

Within this setting, citizens have a right to adequate protection through armament with guarantees for the future, a protection that defends strategic interests within the framework of a common European security and defence policy. The triangle made up of foreign affairs and security, defence and industrial capacity is indivisible, serving Europe's position in the world and its economic and political interests.

Despite the worry shown by the European Parliament (Resolution of 10 April, 2002) and the communications of the European Commission, today there is still no European arms policy to help relieve and resolve the problems that afflict the sector. Among these are limitations on supplying the means demanded by the Armed Forces with the levels they seek and within acceptable time and cost frames.

At CCOO de Industria we praise the peace made possible after the disappearance of the global confrontation of systems which was characterized by the political blocs of the 20th century, the consequence of two world wars that were part of the evolution of the past century. In this setting, the defence industry should never play the incentive role, as an instrument of support and executor for this type of confrontation that produces innocent victims and lays waste to territories and complete societies.

That is why, from the union, we want to introduce the concept of security – a broad and contemporary one – based on working to prevent wars, of continuous development and the peaceful resolution of conflicts by diplomatic means. However, in maintaining the capacity of countries to stand their ground and defend, as well as giving support and assistance for force in accordance with international law, this sector remains strategically important. Real defence capabilities and a productive defence industry are not substitutes but essential elements of such a strategy.

Taking these factors into account, with this work we are trying to show that whatever the differences there are between countries, sectors and companies, the perspectives for the future of the defence and security industry are a consequence of the current situation:

1. A political will to pursue progressive disarmament, the control of armaments and the non-proliferation of arms of mass destruction, to work towards peace, security and international stability.
2. A long economic crisis that has led to drastic reductions in defence budgets with direct effects on the industrial development of the country, as shown by the loss of industrial fabric and jobs.
3. A supply side that is highly fragmented and brings into competition a large number of small and medium size enterprises, sub-contractors with limited capital and poor in resources.
4. The growing complexity of systems that results in an explosion of money spent on research and development, as well as affecting the level of capital intensity in production.

Among the challenges the sector faces in the international context is the more than significant industrial growth that has been seen for some time now in the group of BRIC countries. They have developed capabilities in niche technologies while at the same time starting to produce solid industrial groups in this field. The emerging markets are growing at around 10%-15% and expect to reach a joint spend of almost 1.2 trillion euros.

All these circumstances have led in recent years to a big concentration of companies in the defence industry. There are similar integration processes in the two large blocs (the USA and Europe), but they are developing at different speeds. In the face of a single US market that is fully integrated, there is a lower rate of European integration². Furthermore, emerging players in the global defence market, such as the BRIC countries, are today investing more in defence R&D than the United Kingdom, France and Germany together. While the difference with the USA keeps growing, more than 80% of this gap is the result of the difference in what the companies spend on R&D between the USA and the European Union.

The same occurs with the levels of employment and qualifications in these sectors. The in depth reconversion in the sector, as a result of the end of the Cold War to start with and then the cut in military budgets because of the long crisis that began in the first decade of the 21st century, has left its mark with reductions in size, with the loss of more than 50% of jobs in the European Union, and the consequent privatizations of a large part of industrial activity.

With its proposal for reindustrialization, the European Union is banking on European industry reaching a 20% share of GDP by 2020. It aims to carry out a «third industrial revolution» to develop new markets, creative companies and new, decent jobs. The Commission is responding in part to the goal of basing European competitiveness on quality, making industrial modernization one of the pillars of its policy. «This pro-active focus is positive. However, such measures will only be fruitful if they are rounded off with an ambitious investments plan and a regulatory framework that enables public authorities to play an active role in industrial recuperation, especially through state aid policies that permit the development and survival of long term industrial projects in Europe and the jobs associated with it».

The European defence industry

The European defence sector represents 2.5% of the European Union's GDP. It has sales of more than 200 billion euros, provides work for 400,000

² Ósmosis EEUU-UE. Meanwhile 93.000 americans work in the USA for European defence companies, only 30.000 Europeans work in Europe for USA defence companies (Source: General Dynamics- Santa Bárbara Sistemas).

people directly and another 960,000 connected with it, has a 35% share of global production and exports of 23 million in 2011.

Total military spending in the European Union in 2010 was 197 billion euros, a fall of 3.3% from the previous year, and with four Member States among the 10 biggest military spenders in the world: the United Kingdom, France, Germany and Italy.

France and the United Kingdom account for almost half the market demand, (standing out for the development of their aerospace and naval industries, respectively). They are followed by Germany (with a strong military vehicles sector), Italy, Spain and Sweden (90% of European production is among these six countries, which are grouped together as the Lol)³.

Cooperation and competition throughout the European Union is still an exception rather than a norm. More than 80% of all investments in defence equipment is carried out nationally. One feature of European cooperation in arms is its preponderance in the aerospace sector, where it is a decisive factor in the technological and industrial base of European defence, whereas the land and especially naval sectors are very fragmented⁴. Their state of the art research has had important repercussions in other sectors such as electronics, civil and space aviation, creating growth and highly qualified jobs.

A good number of small and medium size European companies have to coexist with a multitude of US ones, among them giants that are the result of a wave of mergers in the last decade. There are only a few companies that are of sufficient size and capable of asserting their strength at European level as promoters of a system.

Certainly the multitude of SMEs favours innovation and flexibility. But, taking into account the importance of the major systems, the capital costs involved and the demands on research and development, this structure is not enough. Compared with the USA, for example, Europe has a great need to consolidate and restructure, on both supply and demand sides.

Despite all this, European industry is still one of the most powerful at global level, while it has to face up to two main challenges:

³ The United Kingdom and France account for 50% of defence spending among the 26 members of the European Defence Agency (EDA), and, at the same time, 78% of investments in defence technology. The levels of R&D in France and the United Kingdom represent 9.5% and 7% of the total defence budget. Together with Germany, these three countries represent 90% of that total spend in the EDA. The Letter of Intent (Lol) from 1998 led to a framework agreement for the restructuring and operating of the European defence industry, signed as an international treaty in 2000. Its goal is to promote an industrial and technological base for a more solid and competitive defence sector.

⁴ As an example, the national armies of the European Union are equipped with seven different types of attack helicopter and the naval companies are, on average, between three and four times smaller than those in the USA.

- The reinforcement of its major competitors, the USA among them, supported by political power that wants them to maintain their role as the world's biggest power and dominant in production and technology.
- The potential increase of emerging groups, supported by some states that see control of this type of industry as a guarantee of their independence.

Success with these two challenges will involve the construction of a real European political project in the area of security and defence. The project will need to be supported by a financial effort that is distributed among all the Member States of the Union.

The European Union has drawn up Strategic Agendas for key sectors (aerospace, security, air transport) for launching long term programmes that encourage the development of industrial and technological fabric and guarantee the independence of European technology. The ambitious Framework Programmes of the European Union (currently Horizon 2020), seek new technologies and capacities to take on the market. However, R&D projects in defence cannot gain direct access to these.

The COSME Programme has 25 billion euros available to companies and Horizon 2020, 80 billion. Then there is Galileo in the aerospace sector and Copernicus, an Earth observatory with civil and military applications. Maritime security is key and requires cooperation and inter-operability, including early warning and rapid intervention. Then there is the UAV (Drones) sector, where we have been losing the race with the USA and Israel, which is why they are basic elements. With regard to this, the communication from the Commission⁵ on the opening up of the European market to Remotely Piloted Aircraft Systems (RPAS) — and the civil use of drones or radio-controlled aircraft — marks an important step towards the aviation market of the future⁶. All this requires community budget.

Within this framework, the governments of the European Union and the EDA are looking at setting up an investment fund to finance defence collaboration projects. The aim is to encourage greater cooperation in the development of military capabilities and to promote research in the sector. It is necessary to overcome the deficiencies of the Defence Summit of December 2013, with the drawing up of a road map and programmes targeted at covering capacity shortfalls such as the RPAS and counteract-

⁵ «A new era for aviation — Opening the aviation market to the civil use of remotely piloted aircraft systems in a safe and sustainable manner». COM (2014) 207 final. Brussels, 8 April 2014.

⁶ MALE 2020 programme. France, Germany and Italy signed a Letter of Intent for the study to define a MALE unmanned aerial vehicle (UAV). Three companies participate in this programme: Airbus Defence and Space, from Germany; Dassault Aviation, from France; and Finmeccanica, from Italy. www.defensa.com. 19 May 2015.

ing «hybrid war», which is a real challenge for future military operations. What this needs is to recover R&D and innovation spend in this sector⁷.

It is in this setting that the budgetary cuts have been defined. During the years of crisis they have been a common cause in most eastern and central European countries, with few exceptions. Nearly all of Europe has been contemplating a rapid fall in military budgets.

In Germany they will reduce by 25% up to 2016; in the United Kingdom by 8% up to 2015 and France by 17% up to 2016. Italy cut its Budget by a drastic 28% in 2012 and was set to reduce a further by 2014 (Survival, August – September 2012). The United Kingdom has begun applying its Army 2020 Plan under which it will eliminate 20,000 personnel in eight years. Germany will reduce its troop levels by 20% and Italy will save 26 billion euros by 2014, cutting its manning levels by 10%.

As a result of all these processes, priority has been given to the maintenance of some capabilities, along with those seen as necessary to take on new, non- conventional threats such as terrorism, various types of catastrophe and especially in response to the growing and ever more complex threats in cyberspace. All this without forgetting outer space, with the initiative launched in Vienna in June 2013 for an International Code of Conduct for Outer Space Activities.

For Europe to maintain a solid security and defence industry, achieving a critical mass to offer better efficiency and cost-effectiveness, a radical change is needed in the mentality of politicians. Governments have a high participation in the defence industry as clients, regulators and suppliers of licenses for exports, so they should be aware of shortfalls in the current structure and the strict budgetary limits. This demands ordered readjustments instead of the current isolated focuses that prejudice credibility both internally and externally.

The European Union has three challenges to take on: a fragmented defence market in which 75-80% of the purchases are made nationally; the impact of cuts in R&D and innovation and their consequences in competition with the USA and emerging countries; and the existence of ever more complex and real threats which demand a common policy of defence and security.

Effects of community policy on the sector

It was 1996 when the European Commission started to include defence in the framework of the activities and competencies of the European Union

⁷ The Chief Executive of the EDA, Jorge Domecq, has given as an example of risk that precision guided munitions could disappear from the industrial base in a space of three to five years if resources are not pulled together for a common development programme. «We risk turning into a continent of sub-contractors». Europa Press, 6 May, 2015.

⁸ analysing periodically changes in the industry and orienting its communications at restructuring and concentration. Then it was the Lisbon Summit, which set out the way for a new treaty, which saw the launch of directives on defence.

The implication of the European Commission began with the Maastricht Accords (which added the pillar of security and defence to the treaties and created the bases for a European Policy on Security and Defence (EPSD), and then Amsterdam (with the creation of the European Defence Agency, EDA)⁹.

The Commission's Green Paper (2004) systematized the Community's approach to the defence products market as a support for the EPSD. Starting with this report, the European Parliament gave its backing for a solid and viable European defence equipment industry. And with an efficient policy on public contracts these were the basic elements for the development of the EPSD, now known as the Common Security and Defence Policy (CSDP).

Since 2005, the EDA has been working on strengthening the industrial and technological base of the defence sector and providing troops with better equipment, with very limited progress still. More recently it has begun to look at the restructuring and strengthening of the sector with the European Defence Technological and Industrial Base (EDTIB).

In its strategy for EDTIB, the EDA described the key actions that governments should follow to create a strong industrial and technological fabric in Europe. The first is for the different Member States to «identify from a European perspective the technologies and the key industrial capabilities that should be conserved or developed». Some of the larger European countries, although not yet Spain, have already defined these capabilities.

The Defence and Security Directive of 2009 represented a regulatory pillar for the European defence market. Firstly it looked at making the specific rules for the internal market applicable to this sector, with the aim of having fair competition in the market. But in spite of this, defence is still a very specific market with a long tradition of being fragmented nationally.

⁸ Article 42 of the Treaty of the European Union establishes that the common security and defence policy is an integral part of foreign policy and common security. And 42 (3) adds that the member states will put civil and military capacities at the disposition of the Union. It was in 1996 when the European Council published the document COM (96) 10 final on «The challenges facing the European defence-related industry, a contribution for action at European level».

⁹ The European Defence Agency was created in 2004 to give an impetus to defence capabilities in the European Union, to promote cooperation in armaments, to consolidate the European defence technological and industrial base and create a competitive European market.

The two sectors (defence and security) are linked through Directive 2009/43/EC, on acquisitions in defence and security, and Directive 2009/81/EC on inter-community transfers of defence goods and services. Both Directives¹⁰, which were applied from 2012 (Spain has been obliged to modify its Law on State Contracts) will determine in coming years the configuration of a single European defence and security market. That is because they limit, with certain exceptions, the protection of national industries and they will leave a question mark over their efficacy when it comes to conforming a dual industry on the continent and in each of its countries.

The future of the technological and industrial base for European defence is also conditioned by these directives. The diminishing of budgets and also perspectives for acquisitions is having its effect on that base. European military budgets have gone from 251 billion euros in 2001 to 194 billion euros in 2012, while the spending on R&D of all the European Union states together is seven times less than that of the United States.

The communication from the European Commission in 2012 on «A stronger European industry for growth and economic recovery»¹¹, stresses the need to keep advancing towards the full integration of the internal market in sectors like security and defence. Despite the application of a package of measures on defence, the sector still has a strong national dimension and is incapable of taking advantage of the economies of scale needed to improve competitiveness and profitability. This situation has effects not only on the big companies, the national champions, but also on the small and medium size enterprises in the sector.

At the European summit of December 2013, the Action Plan for strengthening industrial policy in the sector came to nothing. The European Council limited itself to highlighting the fragmentation of the European defence markets and the harm this represented for the sustainability and competitiveness of the European defence and security industry. It urged countries to deepen their cooperation, to make the most of synergies that would improve the development and availability of BITDE in the most integrated, long-lasting, innovative and competitive ways.

- The European Council wants to increase investment in cooperative research programmes and for the states to maximize synergies

¹⁰ Directives of the European Parliament and the Council. The first is on the simplification of terms and the conditions on the transfer of products connected with defence within the Community. The second is on the coordination of adjudication procedures of certain works, supply and services contracts for bodies or adjudicatory powers in the area of defence and security, modifying the Directives 2004/17/EC and 2004/18/EC.

¹¹ COM (2012) 582 final, October 10, 2012.

between national research and that of the European Union. Also to reinforce mutual civil and defence research, including essential generating technologies and energy efficiency technologies. The Commission has to evaluate the way in which the results of Horizon 2020 can be used to benefit the industrial capacities of defence and space.

- In the area of support for SMEs, these are recognized as being an important element in the defence supply chain, as being a source of innovation and key catalysts for competitiveness. Also highlighted was the importance of cross-border access. The Commission was urged to investigate the possibilities of additional measures to open up supply chains to the SMEs of all the Member States, thus promoting greater access to the security and defence markets and greater participation in future European Union financing programmes.
- At the same time, the Commission will promote the use of the European Social Fund (ESF) for the professional recycling and adaptation of workers, in particular on projects that cover the needs for competencies, coinciding abilities, and anticipation of change. It will also take into account the potential of the Structural Funds and European investment for supporting regions that have been affected by the restructuring of the defence industry, especially in helping workers adapt to the new situation and promoting economic restructuring.

Given that in the short to medium term it does not appear that Member States are going to take the initiative to reactivate the defence sector – with a few exceptions, such as the United Kingdom and France – it seems reasonable, therefore, that the Commission should take action with regulatory measures to promote transparency and competitiveness in this market. This would be through industrial policies that avoid the loss of the technological and industrial capacities associated with the production of defence materiel and equipment.

In June 2014 the European Commission presented a plan to strengthen the single market for defence, as committed to at the Summit of December 2013, to promote a more competitive industry and to strengthen the synergies between civil and military research, including details and time frames of the actions to be carried out¹². It includes the preparation of a road map that includes, among other measures:

- An internal defence market in which European companies can operate freely and without discrimination in all Member States.

¹² COM (2014) 387 final of 24 June, 2014. A new agreement on European defence. Road map for the application of Communication COM (2013) 542. Towards a competitive and efficient security and defence sector.

- A supply system for security on a European scale under which the Armed Forces can be sure of receiving enough in all circumstances.
- Preparatory action on research, related with the CSDP, to explore the potential of a European research programme that in the future can cover both security and defence.
- And an industrial policy that encourages competitiveness in the European defence industry and contributes to making the most, at affordable prices, of all the capabilities that Europe needs to guarantee its security.

The European Council recognizes that defence collaboration between Member States has to be deeper and more prolonged and that the European Union is going to face up appropriately to the challenges of security. That is why it is vitally important that the European defence industry continues to be a leading world centre for production and innovation, for the creation of jobs and growth in highly qualified ones.

It is clear that the development and maintenance of technology and the critical capacities needed for the future goes beyond the capacity of individual Member States. «While defence and security remain basically a question of national responsibility, more can be done to promote European cooperation. The Commission will contribute to this effort, in particular through strengthening the single market for the defence of and developing competitiveness in the defence industry».

The Spanish defence industry

What is evident in Spain is a lack of industrial culture, along with the fact that for decades there has been little will demonstrated in pushing industry as an engine for the economy. In this setting, the crisis has underscored the imbalances of Spanish industry, resulting in a brusque and profound path into recession that has only accentuated those imbalances. This is evidence that the countries that traditionally grow most do so because they have a solid industrial base. What is more, it has been proved that the countries that have weathered the crisis better are the most industrialized ones.

The Spanish industrial sector has a 15.9% share of GDP (taken as industry and energy), generates 2 million jobs (12% of the total employment) in 129,000 companies with an average staff level of 15 people. (13% have more than 20) It is the sector that makes the biggest effort in R&D and innovation (49.3% in 2011), with the weight of its exports representing 17% of GDP and combined sales that reflect annual growth of 7% since 2009.

For various reasons, Spain has let slip and arrived late for the challenge of industrial revolutions. We are a country that still has to define what

sort of player we are going to be in the digital world. There is capability and talent in Spain, but it is hard to translate these abilities into specific products and services because of the lack of a business culture. That is why the government should introduce changes in the training system, to prepare the professionals of the future.

It is in this framework that the Spanish defence operates. From an industry that was dominated by the former National Institute for Industry (INI) it has moved to one of almost total privatization, with the exception of the shipbuilder Bazán (now Navantia). In this process, several different forms were applied, among them ones run by national industry (as is the case with Indra, the only cross industry company with a high level of participation in all platforms, being the biggest in the sector in Spain and the most international and, since 2014, once again has a public stake, of 20%). Then there are those run from outside by an industrial and technological partner (as with CASA, now part of the European Airbus group, Santa Bárbara Sistemas, now owned by the USA's General Dynamics, and Amper Programas, recently acquired by France's Thales).

The defence industry policy is part of the state's defence policy. As a result, all the principles that define the state policy are included in the Constitutional Law 5/2005, on National Defence¹³, which broadens the traditional concept of defence to the new one of defence and security.

In Spain, the defence industry has a long tradition, but manufacturing in small series and the national competition between systems have prevented the appearance of companies of a functional size that support each other at high level international competitions and that are competitive and capable of cooperating globally as promoters of a single system. Despite the low spend on defence at national level, the Spanish sector has managed to reach eighth place in the world in the ranking of arms exporting countries.

Sales of the sector, civil and military, represent 10% of GDP —100 billion euros – although only 10% is specific to the defence sector and 67% is international, with only 21% of the companies – 78 of them – dedicated solely to this segment¹⁴. They had a 16.1% share of GDP in 2013, dropping nearly 1.5 points over 10 years, with an average share of 16% over the period.

As for sales by autonomous regions of the country, there is a clear lead for Madrid (61% of the total), followed by Andalucía at 19%, the Basque Country at 6%, Galicia 5% and Murcia and Castilla-La Mancha with 3% each.

¹³ This new concept obliged those in charge of industry policy for defence to focus their attention not only on the traditional industry, as supplier of armament and materiel, but also the part that is a supplier of goods, infrastructure and services that are directly connected with the protection of the state and the rights and freedoms of its citizens.

¹⁴ Germany spends 1.4%, the United Kingdom 2.5%, France 2.3%, Italy 1.7% and Portugal 1.8%.

Defence activity as a source of wealth

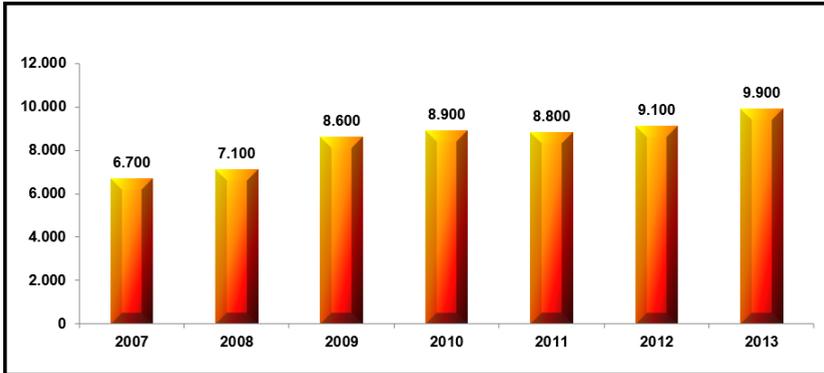


Figure 1. Change in turnover of the Spanish defence industry (in millions of euros). Source: TEDAE.

Spain is responsible for 3% of the world trade in arms and is the seventh largest exporter, maintaining an appreciable level of internationalization in a setting with a high presence of large multinationals. But this does not signify an exporting capacity comparable with that of neighbouring countries (the United Kingdom, France, Sweden...). It is an aspect that needs correcting, especially when we are talking about a country in which foreign debt means that the balance of payments is in deficit year after year in most of the industrial sectors in its economy, among them defence. Some 81% of the sales go to the Armed Forces of the United Arab Emirates, Australia, the United Kingdom, Saudi Arabia and France.

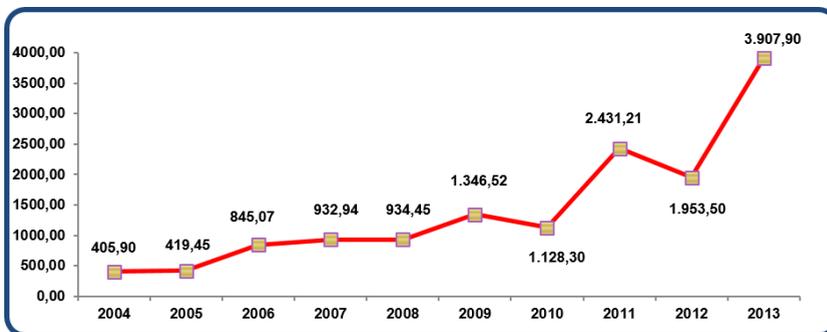


Figure 2. Spanish defence exports (in millions of euros). Source: Secretary of State for Foreign Trade

During the period of crisis (2008-2013) exports attained accumulative increases of nearly 320%, with irregular patterns that saw two years, 2011 and 2013 when new records for the sale of military systems were set (116% and 100%, respectively, over the previous years) and years of negative results (2010 and 2012).

The Central Directory of Companies (DIRCE) of the National Statistics Office (INE) shows there are nearly 1,000 companies with activities in the defence sector¹⁵, employing more than 65,000 people in 2013 (data from INE’s Survey of Active Population - EPA), of whom an average of some 22,000 work exclusively in the defence sector.

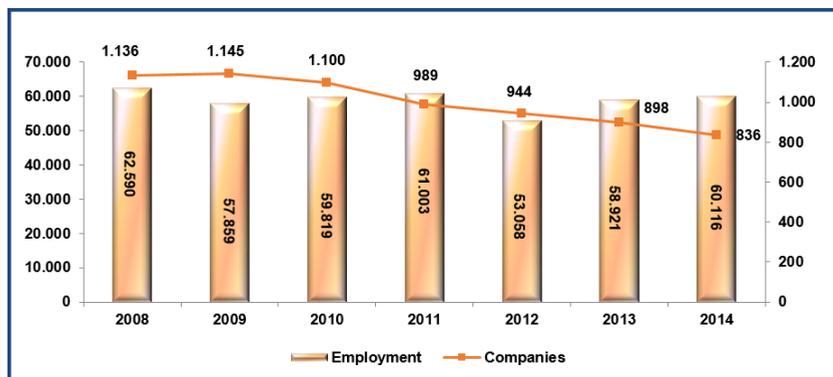


Figure 3. Changes in the number of companies and jobs in the defence industry. Source: EPA for the second quarter of each year and DIRCE.

The defence industry dedicates 10% of investment to R&D and innovation:

- The aerospace sector —civil and military— invests 11% in R&D and innovation, Spain is in eighth position in the world, with exports accounting for 82% of sales.
- The space industry maintains fifth position in the world in this area, with 14% of investment in R&D and innovation and 72% of sales being exported.

TABLE 1. DEFENSE SECTOR	2008	2009	2010	2011	2012	2013	2008-2013
usy people	46.709	43.280	42.421	42.510	41.565	41.048	-12,1%
otal income from exploitation (thousands €)	13.211.9651	11.134.616	10.769.543	10.096.934	10.002.591	10.540.581	-20,2%
ariation of stocks of products (thousands €)	284.475	-58.947	-201.764	-83.935	167.593	-56.355	-119,8%
rofit for the year (thousands €)	241.163	18.635	341.268	491.599	275.564	475.011	97,0%
vestment in tangible assets (thousands €)	400.970	396.426	412.036	424.245	341.763	328.532	-18,1%
vestment in intangible assets (thousands €)	160.091	163.685	341.514	217.707	313.199	223.688	39,7%
pparent productivity (thousands €)	288.947	255.907	249.117	235.545	244.681	255.414	-11,6%
roductivity evolution		-11,4%	-2,7%	-5,4%	3,9%	4,4%	
vestment benefits	233%	3006%	221%	131%	238%	116%	

Table 1. Defence sector. Source : CCOO de Industria, Economy Office.

¹⁵ Between 2008 and 2014 the number of companies in the sector has fallen by 26.4%- 300 companies – while employment was cut by 6% up to 2013 before showing a noticeable recovery in 2014.

All the sectors incorporate high added value, the naval being the biggest at 90%. This is due to the few imports made in 2013 when compared with the volume of sales. It is followed by space (88%), electronic and IT (87%) and missiles (87%).

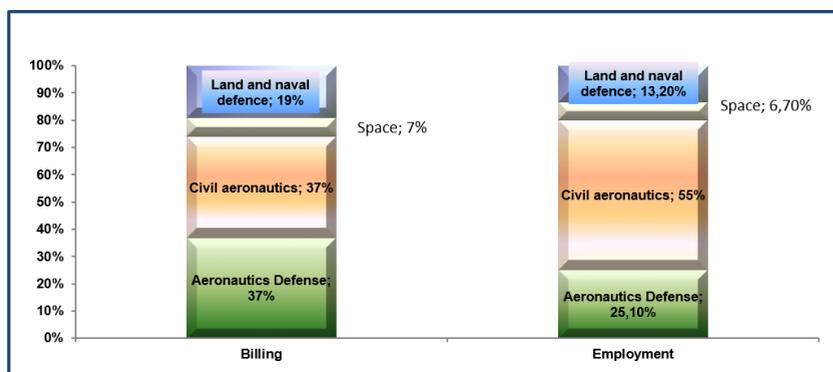


Figure 4. Sales and employment by sectors in 2013 (% of the total). Source: TEDAE

The defence industry is notable for its efficacy in the integration of large platforms such as ships and planes, as well as space optics, submarine acoustics, aeronautical, naval and land simulators, advanced radars, control systems, nano-technology, weapons testing, armour, and explosive and electronic materials, with satellite communications operator as an example of Spanish industrial success. It moves on through computer transmissions, fibre optics, armaments, unmanned observation aircraft, battery-operated missile launchers powered through the development of renewable energy, and in future combat equipment.

However, what is also noticeable is the low number of competitive products in the area of large systems and platforms such as combat aircraft, land vehicles (tanks and armoured vehicles) and space systems and warships¹⁶.

Within the framework of global strategy for defence, it has to be pointed out that there is not a true industrial policy for defence, the lack of which creates many weaknesses in the medium to long term. At the same time, it also has to be pointed out that Spain does not have a tradition of having a strategic definition of security. What have come nearest to it in the past are the National Defence Directives, public since 1992, the White Paper on Defence of 2000, and the Strategic Defence Review in 2003 which did not

¹⁶ Most of the military equipment that is currently made in Spain involves export licenses in the name of foreign companies. For example, the Leopard 2 tanks built by Santa Bárbara Sistemas cannot be built without the permission of Germany and many of the combat systems on the frigates constructed by publicly-owned shipbuilder rely on patents from the USA, which limits sales on the Spanish side.

translate into measures or practical policies. «Working in a coordinated way among the national stakeholders, mainly the Ministry of Defence and the Spanish industry itself, but also with other government bodies and International organisms such as the EDA and the Lol, to confirm its future sustainability will be key to the process»¹⁷.

Structure, production and performance of enterprises

In 2013 nearly 600 companies were on the lists of the Directorate General of Armament and Materiel (DGAM), generating 95 billion euros in sales. Of these 386 (88% with national capital and 86% private) declared sales in the defence sector, with a turnover of 72 billion euros, of which only 7.4% were specifically linked to defence. The rest were in the civil sector.

The ICT (Information and Communication Technology) sub-sectors for defence (45.3%) and naval (42%), account for almost 90% of the companies dedicated to industrial activity in the defence sector. But, in this case, one has to take into account the difficulties there are when it comes to defining this activity in the specific sub-sectors of defence, as many companies also work in the civil sector. In the sub-sectors for armaments (8.1%) and aerospace (4.6%) the presence of defence companies is much less.

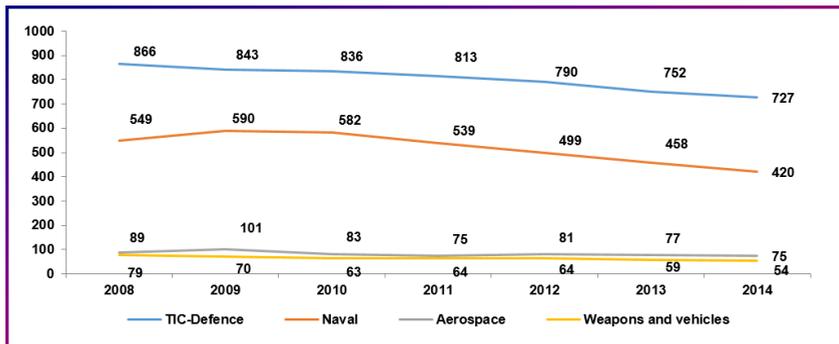


Figure 5. Changes in the number of industrial and defence companies (civil-military). Source: CCOO-Industria, Economy Office, based on data from DIRCE.

On top of the overall cut in the number of companies between 2008 and 2014, those in the sectors of armaments and military vehicles suffered most from the crisis. This is reflected in the 31.7% reduction in their manufacturing fabric during this period, an average of 4.7% a year. They were followed by the naval sector, with an accumulated fall of 23.5% at an average 3% per year.

¹⁷ *The defense industry in Europe*. Spanish Army Brigadier General Arturo Alfonso Meiriño, Deputy director of International Relations at DGAM. Revista Española de Defensa magazine, April 2013.

Less affected by the crisis was the ICT sector with falls of 16.1% accumulated and 2.3% annual average during the same period, and aerospace, down by 15.6% and 2.4%.

The profile of companies involved in the defence market is dominated by SMEs (80%), with small companies accounting for 70% of this total. (56% of the total with less than 50 workers)¹⁸. The larger companies, with more than 250 workers, represent 20% of the total and 83% of the sales.

The Spanish defence industry has been creating the necessary conditions for adapting to the new global situation, incorporating an industrial and technological base to be ready to form part of large European industrial consortiums and to be able to compete and co-operate on an equal basis at international level. The sector is built around a small group of large companies with different levels of diversification, which act as the main contractors and are international benchmarks, and a broad group of SMEs that are highly dependent on the internal defence market.

As a consequence of this process, there has been consolidation in the basic industrial sectors: electronics and IT (Indra Sistemas), aerospace (Airbus Group and Industria de Turbopropulsores, ITP) and naval (Navantia), as well as vehicles (Santa Bárbara Sistemas, General Dynamics) and armament, which together account for over 80% of sales in the sector. They are followed by some 400 auxiliary companies, of second and third tier.

There are some large companies that can work as contractors (10 companies that are quite a bit more than SMEs and which usually work as sub-contractors). Of the four biggest, the top two have 87% of the sales and 82% of the workers. They work in the area of systems integration, a design and engineering capacity where there are few rivals on the global market. This sets them above the rest, which work as sub-contractors for components.

The Spanish defence industry has a high concentration of sales in a few activities (auxiliary, naval, aeronautics, electronics, communications and vehicles that represent around 75% of the total), incorporating specializations in the most intensive sectors of technology that have come through participation in European industrial cooperation programmes.

The crisis struck the sector hard. The worst year in the period between 2008 and 2014 was 2009, with a generalized and large fall in all the sub-sectors. Total production of the companies fell by 25.1% over the period, an annual average of 4.6%.

¹⁸ *The defense industry in Spain. 2013 Report.* Report from the DGAM, Ministry of Defence.

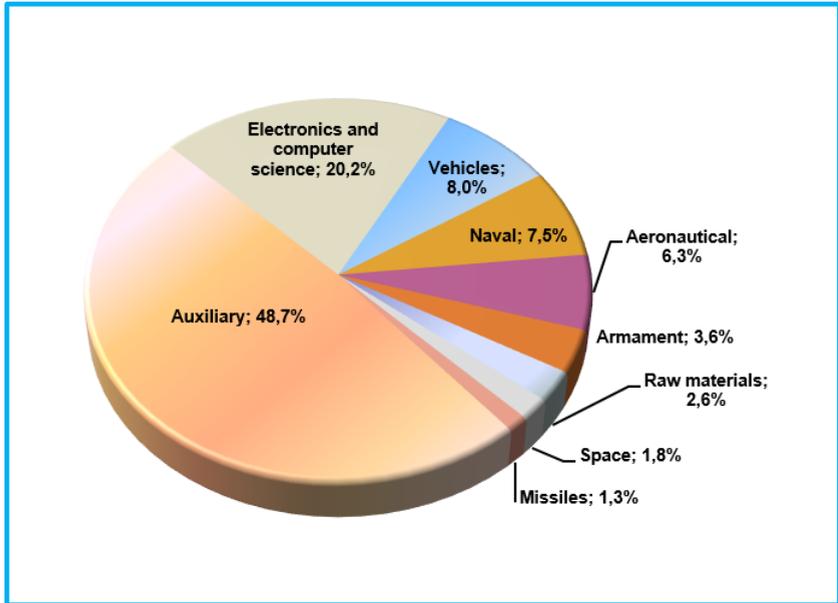


Figure 6. Distribution of company activities in defence (2013). Source: DGAM , Ministry of Defence.

The aerospace sub-sector accounted for most of defence industry production in 2014 (64.4%), more than 18 points higher than in 2008 and above the average 53% for the period 2008-2014. There was only a small drop in 2009 and since then it has not only recovered but become the safeguard for the financial results of a sector that has been severely castigated by the budget cuts in these years.

The rest of the sectors are a long way behind. Standing out among these was the drastic drop in the naval one. It had the same share as aerospace in 2008 of 35.1%, to fall to only 16.3% in 2014, almost 19% loss of participation in that period, the same percentage of increases of the aerospace industry, playing a substitution effect. In this sector, the year 2010 marked the beginning of a whirlwind fall with annual average reductions of participation over the total production close to 4% a year¹⁹, setting the average participation on 28%.

¹⁹ What has to be taken into account is what was said earlier about the difficulties in defining an activity within the specific sub-sectors of defence, where you find naval and ICT, as these also incorporate activity in the civil sector.

Defence activity as a source of wealth

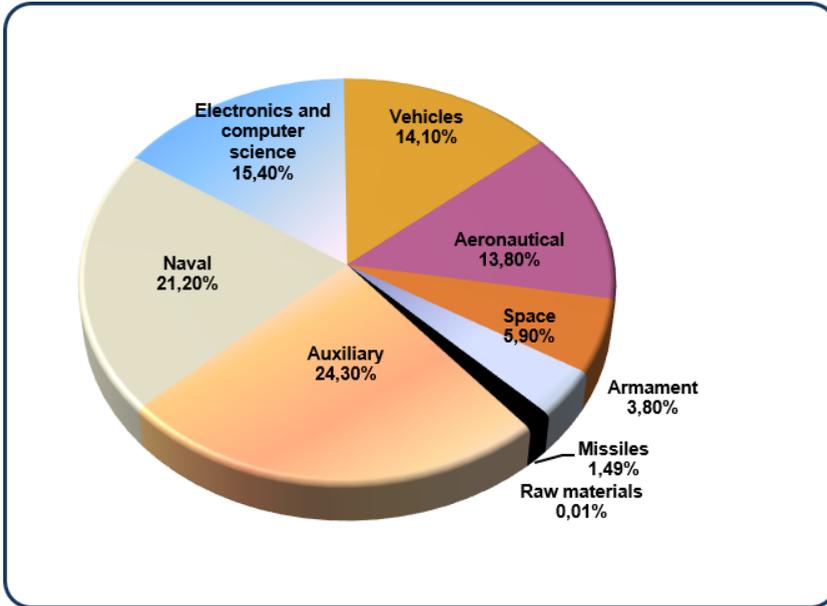


Figure 7. Distribution of sales in defence. (2013). Source: DGAM, Ministry of Defence.

The ICT sub-sector of defence is in third place, with a 14.7% share of the total in 2014, a drop of almost one point over 2008, with an average annual fall of 15.3% over the period. The smallest share is that of armament and military vehicles, although it managed to increase in this difficult period by almost two points and reach 4.4% in 2014.

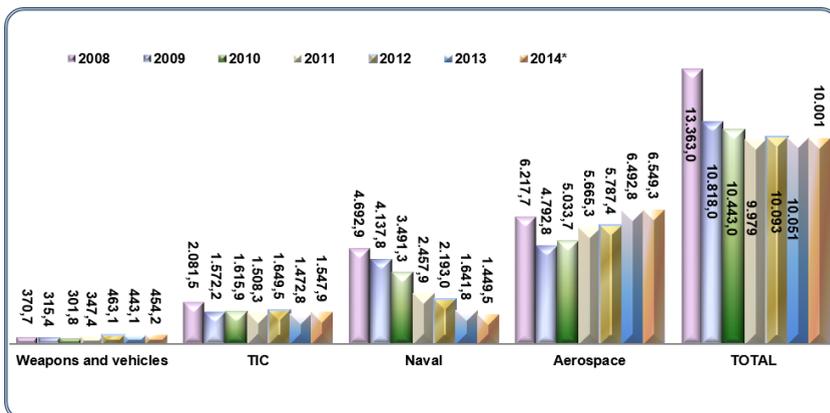


Figure 8. Changes in production for sub-sectors of defence (in millions of euros). Source: INE Industrial poll of Companies (*) Estimated from IPI, IRPI and own estimates.

The progress of the armament and vehicles sector shows an accumulative increase of 22.6% over the period, at an annual average of 3%, thanks to the results obtained since 2012. Accompanied by the aerospace sector, with an accumulative increase of 5.4% and an annual rise of 0.7%, the best years for production were 2013 and 2014.

Sectors that did not manage to compensate for the falls were, above all, the naval one, with a 69.1% reduction in the same period – a 16% annual average – as a consequence of the bad results from 2011 onwards, and ICT in defence (–25.6% accumulative, at an annual average of 5.6%).

In 2013 exports represented 81% of the sales compared with 61% in 2010, an increase that stemmed from the good results of the aeronautical sector. But this reflects falls in all the other sectors (the naval since 2009) with the major reduction in the national market in the last few years. Of the 100 exporting companies, the four biggest ones share 90% of international sales (Airbus Group, Navantia, Indra Sistemas and ITP). The main imports were also in the aeronautics sector (87% of the total of defence imports), followed by the naval sector at 3%. There was a positive balance that year of almost 3 billion euros (118%).

Although there is no Spanish company among the biggest 50 in the world and total national sales are less than those of the fourth largest European company, the sector has made a significant contribution in developing the aeronautical, naval and communications fields. It is one of the few areas of high intensive technology with an international presence in Spanish industry. And a large part of civil, electronic, aeronautic and naval hi tech industry is a direct descendant of defence programmes.

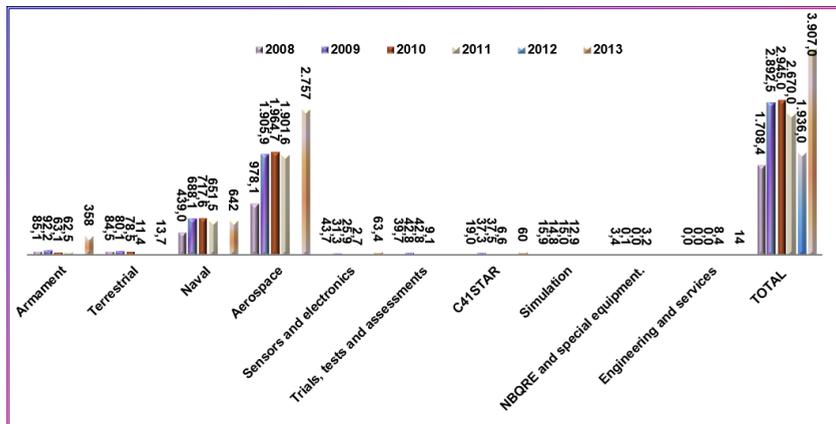


Figure 9: Exports in the defence and security sector (in millions of euros).

This consolidation has been achieved in various ways. In the case of the aerospace sector – which has turned into the engine of growth – it has

been through integration with a large European group; in the naval, with concentration on one large company; in the electronic and IT sectors by establishing permanent or interim strategic alliances; and in the case of armament, Santa Bárbara Sistemas has been integrated into General Dynamics.

The financial results (ebitda) are in line with the production levels of the different sub-sectors that make up the defence industry. There was an accumulated reduction in profits for the period 2008-2014 of 29.4% and an annual average reduction of 3.9% in the results for the companies in the sector as a whole. The year 2009 was the main cause, but 2013 and 2014 were not far behind.

Looking at the sectors, what stands out is the irregular movement of the aerospace sector in this period, reflecting an accumulated increase in results of almost 60% and an annual average of 15.1%. With ICT, results fell accumulatively by 46.2% (12.2% annual average) with the drop accelerating from 2009. The sector for armament and vehicles had been carrying negative results since 2008, which began going down from 2010 and, apart from the losses suffered in 2013, finished 2014 with positive results. It is the naval sector that reflects falls of more than 100% in its accumulated results for the period, a consequence of the big drop suffered in 2013 and losses that continued into 2014.

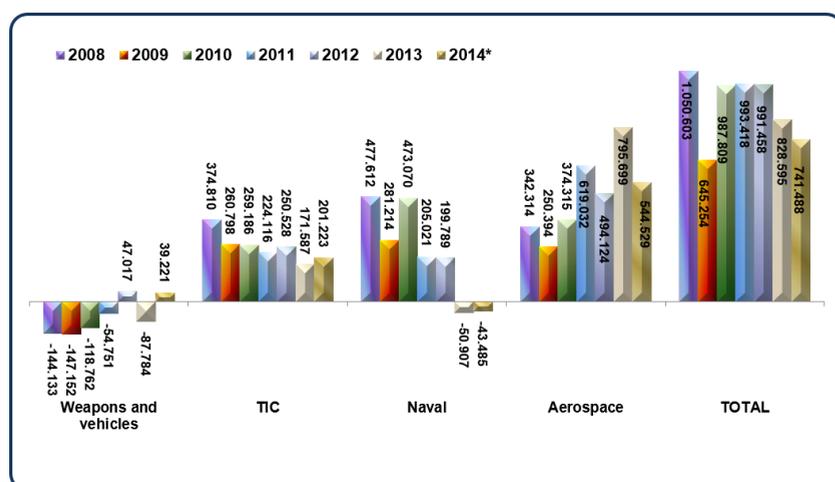


Figure 10. Results by sub-sectors of defence (EBITDA in thousands of euros). Source: INE Industrial poll of Companies (*) Estimated from IPI, IRPI and own estimates.

The publicly-owned group Navantia and Indra were among the top 100 defence companies in the World in 2010. The first, with 96% of its overall business (1.5 billion euros) in position 45, and the second, with 23% of

its total business (582 million euros) in 84th spot, having reached 65th in 2009. On 25 July, 2014, the government awarded the Ministry of Defence the guardianship of the state's shares in military industry (basically the 100% in Navantia and 20% in Indra), although the shares remain in the hands of the state holding company, Sociedad Estatal de Participaciones Industriales (SEPI), which comes under the Ministry of the Treasury and Public Administration.

What can be seen in Spain is a lack of an integrated vision for national business interests that has fed structural weaknesses emerging from the financial crisis and the introduction of new European community directives on acquisitions in security and defence. The lack of size and the strong dependency on some critical technologies are the main problems for the Spanish defence industry when it comes to taking on these new market challenges.

At the same time, the evolution of the budgets and investments has not facilitated a recovery for the defence industry. The year 2014 saw the seventh consecutive annual reduction in the budget, swelling the overall reduction to over 32% of the budget in 2008, when it reached a record of 8.49 billion euros. The average annual reduction is of 5.4% and the biggest fall was in the amounts dedicated to investments, which had already been suffering big reductions: of 30% between 1990 and 1997, 26% between 1998 and 2008, and 20% in the annual average variation from 2008 to 2014, an 80% reduction in all over the period.

The loss of competitiveness, derived from falling investment, could be avoided in its intensity, although it can be mitigated if there is a push for maintenance and modernization in investments.

The aerospace sector has taken a 57.2% share of the investments that have been made in our country's defence sector in 2014, nearly 16% up on 2008. In 2010 they reached 66% of the total investment. It was followed by ICT, with 28.3% in 2014, slightly down on 2008 levels (29.6%), after getting over the dreadful year of 2010.

The armament and military vehicle sub-sector was in third place, with a 10.7% share in total investments, an increase of seven points since 2008 and overcoming the reduction suffered in 2009. Like the rest of the ratios in the sector, naval activity saw a substantial loss, of 21 points compared with 2008, with the biggest falls in 2013 and 2014. This demonstrates the difficult situation for this sector and the need for deep-rooted measures to avoid the loss of one of the strategic activities for the country in terms of the employment and added value they have been providing for the Spanish economy.

In spite of the crisis and the poor production results, investments have grown by an accumulative 5.7%, barely 0.3% on average per year. It was

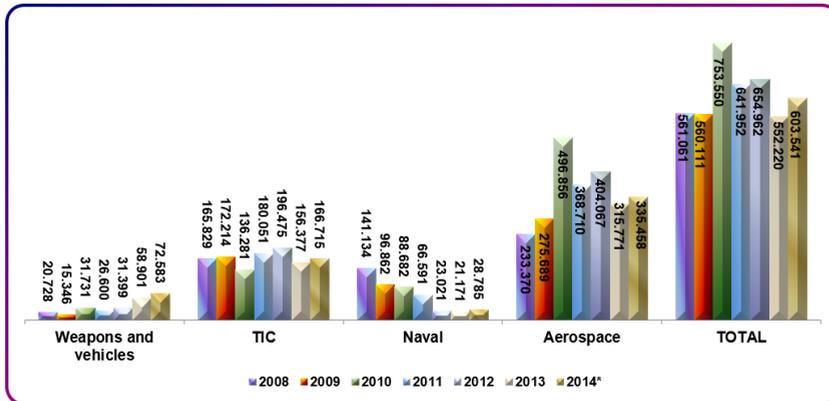


Figure 11. Investments Totals for defence sub-sectors (in thousands of euros). Source: INE Industrial poll of Companies (*) Estimated from IPI, IRPI and own estimates

2010 that saw the biggest change in investment in the period (35%), while 2011 and 2013 were the worst years, with average reductions of 15% compared with previous years.

These results are conditioned by aerospace sector investment, maintaining upward growth and reaching an accumulative level of 43.5% for the period 2008 to 2014, with an annual average of 5.2%. The year 2010 stood out as the most positive and 2013 as the most negative. It was accompanied by the armament and military vehicles sector, which saw an accumulative increase of 250%, an annual average of nearly 30%, and in which the years 2010, 2013 and 2014 ensured positive growth over the whole period.

Despite the terrible effects in the naval sector, with a reduction of more than 90% in the period, some 27.1% annual average, this sector started to recoup investments in 2014. Meanwhile, the ICT sector of defence has maintained a neutral investment path with an accumulative increase of 0.5%. The years 2010 and 2013 were the most negative, with each seeing reductions in investment of more than 20%.

Highly qualified employment in the defence industry

The high level of duality in production in the sector is also reflected in employment. It is very difficult to separate the number of people whose work is exclusively involved with defence and security activity from those dedicated to civil and security work.

This can be seen in the aerospace sector, where a little more than 35% are mainly involved in the defence industry, in companies such as Airbus Defence & Space, Hisdesat, ITP, Alestis, Sener and Tecnatom. The same can be said of the naval sector, especially with the publicly-owned Na-

vantia. But the most significant is ICT, where many activities are carried out by the same workers in producing military and civil products (Indra, Thales, Alenia). Only in the sub-sector of armament and military vehicles can people be identified as working solely in the defence sector (Santa Bárbara-GDELS, Expal, Sapa), although nearly 20% is produced in factories for general vehicle production (Sener, Iveco, Uro).

This duality is reflected in the different statistics when it comes to identifying the number of jobs in this sector. The EPA polls from INE point to more than 60,000 people being involved while sources at the Ministry of Defence and the business association for the sector quantify the number as being around 20.000. That is to say, three times less. There is not really a contradiction, as the duality of products can be attributed to either of the sectors, civil or military, this being one of the peculiarities of the activities.

During the period from 2008 to 2014, there was an accumulated loss of jobs of nearly 4%, at a yearly average of 1%. The situation was stirred up by the strong effect in 2009 and especially 2012 of staff who were laid off work temporarily, especially in the naval sector, and which was not compensated by the growth in the aeronautical sector. After the big fall in 2012 employment grew by 11% in 2013 and by 2% in 2014, but still far from the levels before the crisis.

For jobs dedicated exclusively to the defence sector the crisis arrived a bit later, although the consequences were the same: an accumulated reduction of 6.6%, and an average 0.5% annually. But taking into account the different sectors, the effects of the crisis on the defence sector have been much less than those on industry in general and the country's economy as a whole.

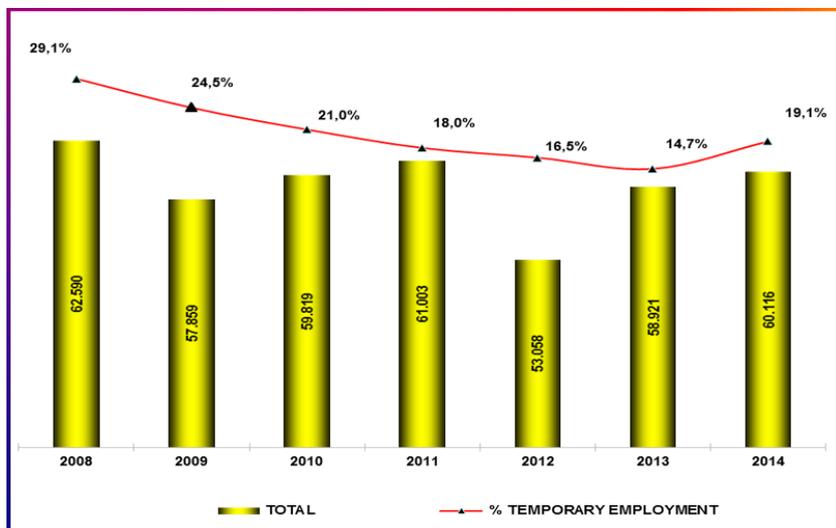


Figure 12. Changes in employment in the defence and security sector. Source: EPA survey, drawn up by the Economic Office of CCOO de Industria.

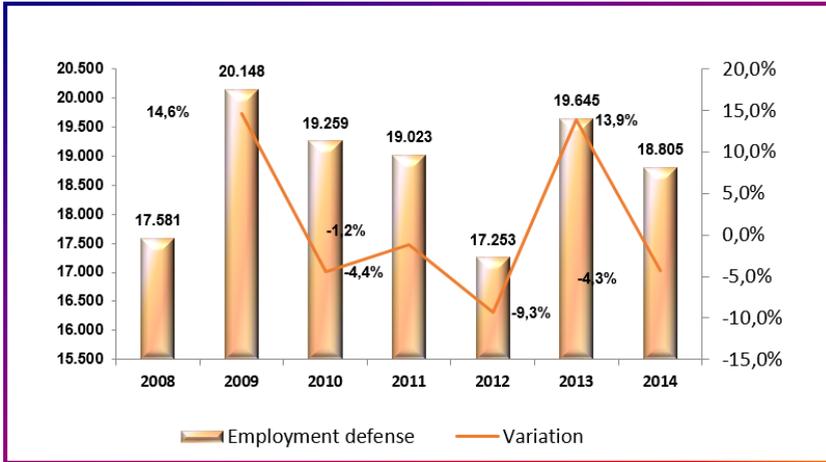


Figure 13. Changes in employment in the defence and security industry. Source: TEDAE.

Taking this situation into account, 99% of the companies in the defence industry have salaried staff, of whom 83% are on indefinite contracts. This shows a growth in their numbers of 31% during the crisis, while those with temporary contracts suffered the consequences of the cuts (-49%).

What is more, 80% of those employed are male, 66% are under 44 years old and 35% less than 35. Yet the biggest growth during the crisis was among those over 55 (57%) and those aged between 35 and 44 (16%). There were reductions in all the other age ranges as a result of the general reduction in employment between 2008 and 2014.

Between engineers and machinists, the industry employs a wide range of professionals in processes and activities that have a direct part to play in areas such as design and management of the value chain. Most of them

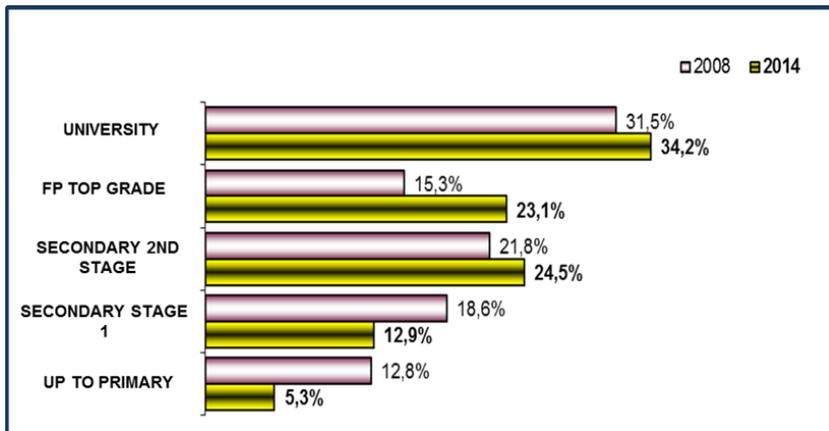


Figure 14: Distribution of defence workers according to study levels. Source: EPA survey.

are people with university degrees, a growing tendency in recent years. Behind them are people with higher level secondary school studies and higher grade professional training. Together these categories cover 82% of jobs in the sector.

As for their distribution among the sectors, aerospace saw an annual average increase of 10% in the same period, while the naval one had an average yearly reduction of 13.7% and an accumulative one of 50% for the period 2008-2013. The vehicles and armament sector dropped by 2.3% while the electronic and IT (defence ICT) saw a small increase of 0.3%.

We are talking of sectors that employ around 40% engineers and graduates, 47% highly qualified technicians, and the rest with a technical profile. The aeronautical sector (8,200 workers) includes almost 45% graduates and higher grade engineers (28% with higher degrees, 15% middle level and 51% without), and in space (400 workers), 50% have higher degrees. This example seeks to be an antidote to the volatility of the employment market, reinforcing the industrial sector and its activities as having greater potential for innovation and productivity. It should be seen as a qualitative change, responding to the negative consequences of reform of the labour market²⁰.

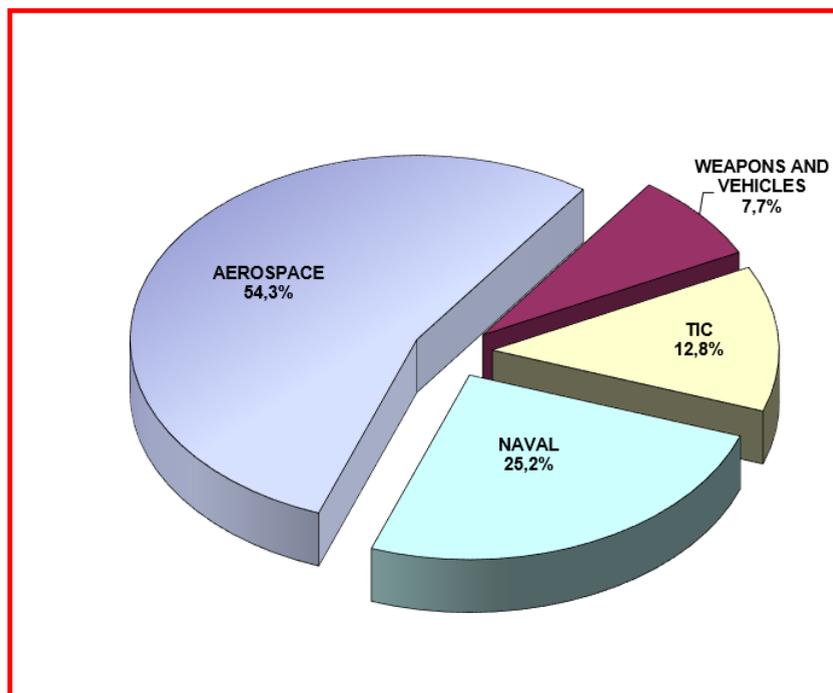


Figure 15. Distribution of defence workers according to sector (2014). Source: EPA survey.

²⁰ CRUZ VILLALÓN, Jesús. *Paisaje del empleo tras el tsunami de la crisis*. Professor of Labour and Social Security Law at the Universidad de Sevilla.

In the naval sector, with 5,800 workers, almost 40% of them are qualified personnel (14% with higher degrees and 25% medium level). With electronics and IT, more than 50% of its 2,200 workers are qualified (23% with higher degrees and 32% medium level). In the land vehicles sector, which employs 1,200 people, almost 40% are qualified (27% with higher degrees and 10% medium), and in the case of armament, over 30% (22% higher and 10% medium).

This long period of crisis has carried us to the centrality of traditional sectors that only provide unqualified jobs with intensive labour and little productivity. But the defence industry has managed to conserve a high level of qualified staff, to the extent that 75% of employees have technical qualifications. Some 34% of the workers have completed a university career, 23% a higher level of professional training and 38% have finished secondary education.

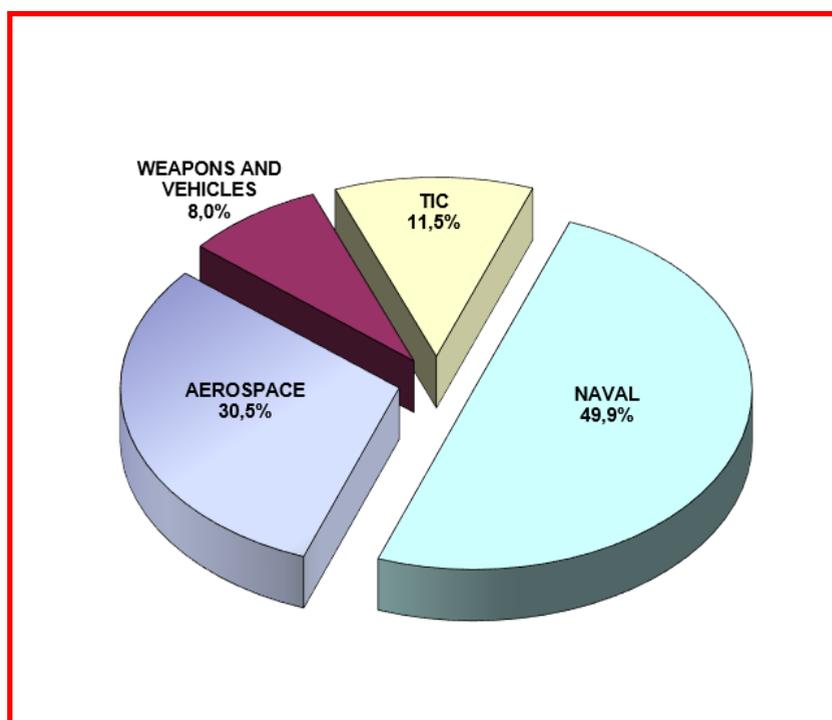


Figure 16. Distribution of workers according to sector (2008). Source: EPA.

To maintain an adequate level for the needs of the industry and, above all, to be able to offer capabilities to compete in the international market, it is necessary to focus on Professional Training. It is a key element for pre-

paring the highly qualified professionals that that the defence industry needs. It is an area in which Spain is deficient.

The model of dual training, which combines a solid and general theoretical training with a practical and specific application in companies, has been used successfully in other countries but in Spain has still not taken shape. This directly affects smaller companies. Lacking competitive capacity in the value that qualified staff bring, they have to turn to price. What is more, the lack of a well articulated system of professional training broadens the gap between the real needs of the industry and the training of professionals, as well as the capacity to compete in ever more demanding markets. It can be seen in the differentiation in productivity, flexibility and innovation²¹.

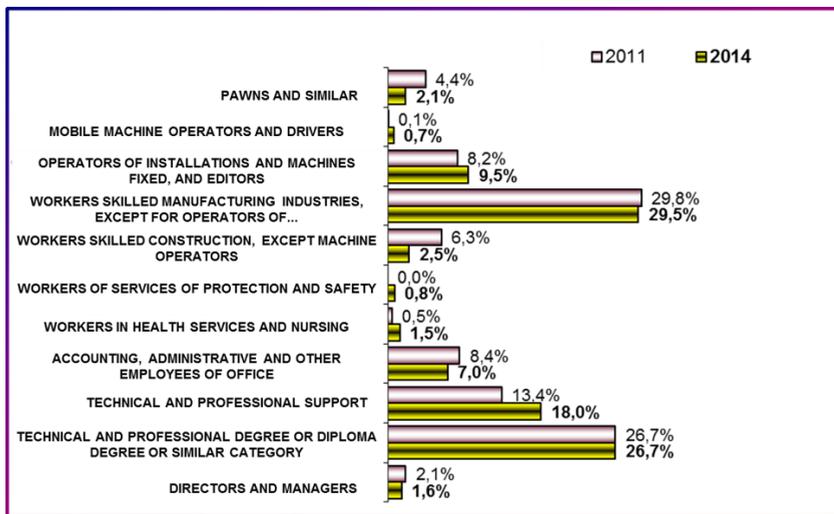


Figure 17. Distribution of defence workers according to type of work. Source: EPA survey.

Technological characteristics of the defence industry

From 1995 until the start of the crisis in 2008, the total spend on R&D in Spain did not stop growing. There were significant ups and downs, reaching growth levels of 15% plus in 1998 (16.7%), 2002 (15.5%) and 2006 (15.7%). However, once the crisis began the trend of these indicators has reversed. From 2009 (-0.7%) it set out on a downward stage that reached -5.6% in 2012 and with a fall of -2,8% en 2013, the last year for which statistics are available.

²¹ *Hot topics of the aerospace and defense industry . New direction for a sector instead. Pwc 2014.*

It is a negative change that has not been followed by neighbouring countries, especially Germany and France. They did not stop growing from 2009 to 2013, with an average increase over the five years of 4.42% and 2.82%, respectively. In this same period the average spend in the 28 countries of the European Union went down by -1.1% in 2009, but then grew again at 4.1% in 2010, 5.1% (2011), 3.9% (2012) and 1.5% (2013).

The main news for 2013 was that for the first time since the start of the crisis the private sector – with 46.9% (companies 46.3% and non-profit making financial institutions, 0.6%), spent more on funding R&D than the public sector at 45.7%. Meanwhile, Spanish companies maintained their R&D staff even though they had not invested in new assets for years.

The defence sector plays a fundamental role in innovation (internet, microwaves, GPS...). In 2013 the USA accounted for 35.1% of the world's R&D and innovation, the European Union 29.4% and Japan 18.9%, while China reached 3%. This situation has a direct effect on technology policy and development of the sector. We cannot talk about improving exports without referring to the innovative content of industrial activity. Nor can we talk about qualified jobs without having available the activities that bring high added value.

It is important to identify the technological areas where there are opportunities for innovation, such as the aerospace sector, electronics, and IT and communications systems, as well as the links between civil and military technology.

Investment in R&D that is geared to security and defence represents an important part of the state's research budget. This supposes in advance that it is an important source of economic resources for industry and that, well used, can considerably strengthen its capacities.

The impact of the principal programmes of defence on R&D and innovation goes like this: 16.2% of investments in defence – some 27 billion euros in the main modernization programmes of the Ministry of Defence – goes to hi tech industries and 24.8% to sectors that are knowledge intensive.

Most of the R&D and innovation spend is destined for the civil sector (89%) while military research receives a minor (11%) and decreasing part. In fact, in the last few years, the cuts in funding assigned to military R&D and innovation programmes have been higher than those on programmes connected with civil projects.

During the period 2008-2014, there was an accumulated cut of 77%, an annual average of 11.5%. Only in 2014 and 2015 were there increas-

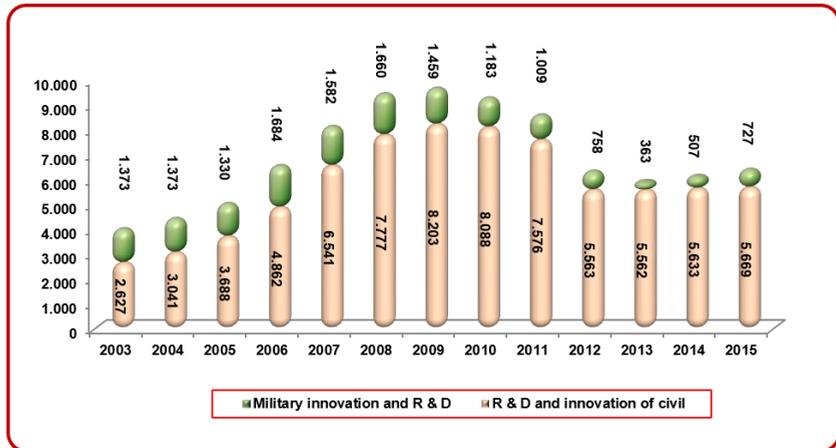


Figure 18. R+D+i policies in the general budget (in millions of euros). Source: Consolidated budget for spending policies.

es (40% and 43%, respectively, over the previous years), and they did not reach half of that budgeted in 2008²². R&D in defence went down by 25% in 2012 and by 52% in 2013, to increase according to overall budget projections by 40% in 2014 and 43% in 2015. The contracting of R&D investments in defence depends more than other sectors on public investment.

It has taken some years to draw up the list of technological and strategic industrial capabilities that Spain should be preserving as a base under Directive 2009/81/EC. At the end of May 2015 the Cabinet defined the areas of knowledge that affect the essential interests of security and defence, applicable to land, naval, air and space sectors. These represent the specialization goals for the industry to become more competitive, banking on those that offer better capabilities for competing and protecting them from foreign competition:

- Command and control, communications, information.
- Cyber-defence.
- Information, surveillance, target acquisition and reconnaissance (ISTAR).
- Traffic control and navigation aids.
- Critical systems embarked on platforms.
- Space systems, for handling data and missions.
- Equipment and arms systems simulation for advanced training.

²² As an example, pointing out that the public company Navantia has lowered investment on R&D and innovation around 57% in the 2010-2014 period.

- Systems for navigation, guided controls and payloads for missiles and complex munitions.
- Complex systems integrated with other advanced arms systems where the integration requisites are connected with essential defence and security interests.

For many years the policy for research and development in defence suffered various deficiencies. There was a lack of participation in international technological forums, of coordination between the different research bodies, and of control and tracking mechanisms. For a sector that depends on technological leadership to survive, this deficiency has turned into a structural one that weighs down on capacity for future development.

Innovation in security and defence is directed more at applied research and development, using advanced technologies but with a medium-high level of maturity. The phase for development, trials and evaluation represents most of the activity in this sector. In many cases, development includes activities prior to the production of the system, the experimental content of which is often limited.

At the start of the crisis the resources assigned to military R&D were reduced considerably. These make up a small part of the actual spend - generated by the public research bodies at the Ministry of Defence and managed by the ministry itself - alongside most of the Chapter 8 resources which are managed by the Ministry of Industry and correspond to returnable credits to arms manufacturing companies. The changes in the budget, as far as the National Institute for Aerospace Technology (INTA) is concerned, have two different parameters: the budgets of INTA and the hydrodynamics test centre CEHIPAR (Canal de Experiencias Hidrodinámicas del Pardo) up to 2014 and those for 2015 for the new INTA with the incorporation of the technological institute ITM (Instituto Tecnológico La Marañosa) and the Army Engineers' Laboratory (LABINGE).

The state's investment in innovative projects should not only be guided by criteria that mean improvements in security and defence, for which the prime factors are those such as cost, delivery times and the quality of the product. It should also take in broader strategic criteria and a longer term vision, to include areas like employment, technology, exports, regional development and the setting up of national industrial leaders in the European and international markets²³.

²³ *Innovation in defense and security*. The COTEC foundation for technological innovation.

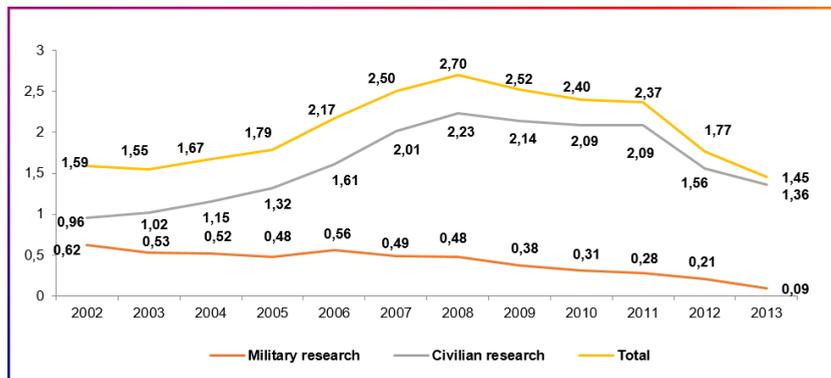


Figure 19. Public Budget (PGE) for R+D+i (weighting of the spending policy 46 on the PGE). Source: Treasury Ministry, and AAPP. PGE ICONO (Spanish R+D+i observatory).

The Ministry of Defence recognizes that Spain, « lacking the calling to stamp a greater technological content on defence platforms, is committing itself to develop R&D projects with the F-110 frigate and 8x8 armoured Vehicle (78 million euros) by assigning them to Spanish companies, with the collaboration or not of foreign ones, constituting a new investment cycle in defence that will be different from the first investment cycle»²⁴. This came within the priority framework set up by the government to strengthen the industrial sectors in Spain and, in particular, the defence one. An R&D that is targeted at generating its own products with export potential and aimed at industrial and technological specialization, with foreign and national alliances, that will orientate the industry towards industrial consolidation and international markets.

Investment must be made in dual technologies and strategic industrial capabilities should achieve technological leadership in their respective speciality areas, generating knowledge and innovation that is applicable to other sectors and markets. The sustainability of a sector demands thinking international. With the expected map of regional specialization in Europe and an international defence market that is becoming ever more globalized, the sustainability of our industry will unfailingly depend on an improvement in competitiveness.

It is necessary to promote R&D and innovation for the creation of patents that later bring returns. Spain is a country with the least returns on each euro spent on R&D and innovation, except on projects within the aeronautical sector. The convergence between civil and defence is unstoppable. Duality offers big opportunities for each field that will see the target market expanded for their work:

²⁴ AGUIRRE Pedro, Secretary of State for Defence in the *Expansión* daily, October 29, 2014.

«It is not just about satisfying the needs of the Armed Forces but advancing in the consolidation of the industrial base, advancing with our model of R&D at the same time as we strengthen a fundamental aspect of our sovereignty»²⁵.

Framework of union's participation and proposals in the European defence industry

The geopolitical and economic transformations of the last few decades require a strengthening of the common voice on industrial policy and new social dialogue to carry out the necessary restructuring that is needed to attend to these changes, so that Europe, the European Union, is not left on the sidelines by global competition.

Industry and the defence sector have been moving together since the creation of the European Coal and Steel Community (ECSC) and the European Union as they are key sectors for the European economies and for society as a whole. The defence industry is part of the engine of technological development, a source of qualified jobs and one that brings greater military cohesion.

It is also crucial for there to be a political accord among Member States to develop common programmes that incorporate the different interests of the national industries. These should be capable of establishing an independent position for Europe at international level and be based on technology developed in Europe. In this way the continent will be able to conserve its position at the front of the pack. The success of European production in the world will depend on the development of a stable internal market on the continent.

There are four arguments in favour of the European defence industry and these central competencies:

- The crucial function of the techniques and weapons of the defence forces in terms of security policy is the decisive argument for maintaining it.
- Defence is a key industry in the field of state of the art technology, with its qualified personnel and a knowledge base that should be preserved for the future.
- Maintaining employment, including proposals for training and qualification programmes, is a priority for an activity that requires a specialist workforce.
- The European policy on security and defence also needs a military component and an independent defence technology base.

²⁵ Report issued by the Ministry of Defence: The Spanish defense industry. Future strategy. Ministry of Defence and Ministry of Industry, Energy and Tourism, with the collaboration of TEDAE. Madrid, 3 December, 2013.

And the five steps to be taken to bring it into effect should involve:

- The drawing up of common and harmonized norms and needs that facilitate the production of arms systems and equipment that are useful for more than one country.
- Coordinating demand, synchronizing acquisition schedules, especially for major systems, in a way that industry gets better and more stable demand.
- The application and interpretation of the directives, with greater transparency and equal access to the markets of each country and without forgetting the need to harmonize the purchases of armaments and materiel.
- Common research in the defence sector for the whole of the European Union, managed by the EDA and facilitating access to the Community's R&D funds.
- Identification of the leading European capabilities to be developed and preserved – and their locations in countries – to avoid a few ending up with all of them.

It is necessary to determine what are the key European industrial capabilities and investment policies to promote a solid European production base. National goals should be combined with European ones, as should resources, from both financial and industrial points of view.

At the same time, the situation of economic hardship suffered during the crisis has locked Member States into national policies for the processes of acquiring military capabilities. That is why the European trade unions are asking the Commission to present an action programme for defence that guarantees maintaining in Europe technological and industrial capacities that are fundamental and strategic for the future of the European defence industry. The programme should coordinate and integrate the measures adopted by the Member States on supply and demand. And to draw it up and get it put into practice we are calling for the setting up of a Council of Ministers of Defence and their coordination with the Council of Industry Ministers.

The economic considerations, which demand activity in this industry, will involve new forms of national and European industrial policy so that the necessary consolidation of the defence industry responds to needs in terms of defence capacities. Within this framework, the restructuring and development of European industry can only be managed in a context of cooperation between the industrial, political and social interests of the states, the European Union, the companies and the trade unions.

Whatever the model that is consolidated in the European Union, national markets will be overtaken by the processes of integration and the only companies that will be successful will be those with sufficient levels of

technology and financial resources to take on international collaboration projects and be capable of integrating highly complex systems. In this way, one of the essential factors in developing this industry will be the policies connected with research and defence and dual use technology. It is essential that European finance policies in this area include the defence sector via research programmes and their integration in Horizon 2014-2020.

The situation demands a reorientation of priorities. If spending more is difficult, spending better is necessary and there is a significant margin for doing this. The budgetary limits should be compensated through greater cooperation and a more efficient use of resources. This can be done through support groups, specialization, joint research and purchasing, with a dynamic new focus on civil-military synergies and greater integration of the markets.

After the European unions reproached the European Commission for the scant participation of workers' organizations in projects connected with capacities, aptitudes and knowledge, in October 2014 it was agreed with the Commission that unions would take part in some of the political initiatives planned for the implementation of the road map for the security and defence sector.

For that, we carried out a study on competencies and abilities in the defence sector, given «the need to deal with the whole gamut of necessities on capacity matters to be able to respond to the great number of challenges that Europe is facing»²⁶. Where the Commission can make an important contribution is in the area of non military security (for example, the fight against terrorism, the protection of external frontiers, maritime surveillance and civil protection).

Among the recommendations put forward for the European defence strategy by the European trade union federation, IndustriAll²⁷ is the need for a common defence policy for Europe, to defend industrial activity and with it jobs. Other recommendations were:

- The start of any restructuring of the defence industry to be conditioned by the political will to define an armaments system directed at the future.
- Reaching a broad consensus on the tactical demands so as to be able to propose to companies that they collaborate among them-

²⁶ In the framework of capability development, set out in COM (2014) 387 final, of 24 June, 2014: «A new deal for European defence».

²⁷ IndustriAll European Trade Union was formed in May 2012 from the merger of three trade union federations: The International Metalworkers' Federation (IMF), The European Mine, Chemical and Energy Workers' Federation (EMCEF); and the European Trade Union Federation of Textiles, Clothing and Leather (ETUF-TCL).

selves on products that guarantee a high level of production and are competitive enough to be exported.

- That it is necessary for the European Union to set up quickly research institutions that are applicable to the area of defence. Also, that the EDA be sufficiently funded to carry this out, to plan for the strengthening of the technological and industrial base of European defence.

What needs a determined bid is to finish work on a Common Security and Defence Policy, paying special attention to the definitive boost it will provide, with the goal of achieving greater European integration in the development of military and industrial capabilities.

Political and sectoral strategies: proposals for public and private action in Spain

If we do not want the effects of the crisis to turn the country into a wasteland, remote from the development of the main European and global economies, CCOO de Industria believes that giving an impulse to this sector is essential for the recovery of sustainable growth as an answer to the economic and social problems that face us. In this respect, we agree with the statement from the Ministry of Industry that « having solid macro-economic bases and stimulating the strengthening and development of a competitive industry are key elements in building a new growth model».

But, before that, Spanish industry needs to overcome the structural deficiencies in its economy, a situation that dates back to the industrial restructuring of the 1980s. That is why people speaking on behalf of society and the government are calling on the political groups involved in the institutions that make up Spanish society to be part of the future development and implementation of the commitments made at the Mesa de Industria y Empleo working group. There is a need for a national pact that will make its contents effective beyond the legislature at the time, through explicit support in parliament.

«The priority is to make sure that industry plays the fundamental role that it should have in the process of recovery and growth. It will be a long term effort that must be maintained beyond the politics of the present moment, one that sees the impulse of industry as a matter of state»²⁸.

²⁸ Declaration on industry, competitiveness and employment. Agreement reached between the Ministry of Industry, Energy and Tourism with the Spanish confederation of business organizations (CEOE-CEPYME) and the trade unions CCOO and UGT. Madrid, 15 April 2015.

Unravelling in this framework is the structural deficit facing the Spanish defence industry, because of a lack of planning. There are no models for the transfer of technology, few patents are registered and there is little innovation. At the same time, the expectations from the government's management of the economy reflect negatively on this industry. So much so that the very Secretary of State for Defence has stated that «some companies are going to fall by the wayside».

We cannot resign ourselves to government policies for this sector, lacking investment in programmes and in technological development. Because the four basic pillars that the Spanish industrial fabric needs at this moment are: Armed Forces that are demanding and have a budget; a competent and competitive industry; and training centres that provide qualified technicians to keep feeding companies in the sector.

That is why we at CCOO de Industria have been declaring for years that, as well as drawing up a state policy for defence, Spain needs to consolidate inter-ministerial commitments to tackle all the problems that surround the security and defence sector. This includes the need for action to get society behind the effort to promote the defence sector in general and its industry in particular. And society is only attracted with transparent and clear information about the benefits of the industry in general and defence and security in particular.

What is urgent is to prioritize the exploration of sources of financing - both public and private and national and European - and to express clearly the appropriate mechanisms for guaranteeing the planning, stability and sustainability of investing in defence and security, to facilitate our development as global players. It is worrying to see the serious situation that the naval sector, both public (defence) and private, is going through. And, the space sector, where the lack of finance has had serious consequences when it comes to guaranteeing its continuity.

Public participation should reflect the Ministries of Industry and Economy as being in charge of the industrial and financial policies of support for innovation and the Ministries of Defence and the Interior as observers and the link with the operational users, as with the projects in European framework plans. The presence of the Ministries of Foreign Affairs and Economy, through (export board) ICEX, is also fundamental for guaranteeing the success of internationalization. Foreign Affairs also has to sanction and approve possible exports to emerging countries and those that are increasing capacities, although they are not emerging.

Conditions of access are limited by technological and industrial factors, which are decisive for competitiveness, and by political factors that can be determining, given that purchases are made by governments. This requires resolute support from the government for any export or internationalization plan, an aspect that was lost following the privatization of

industry, and which the recently introduced government to government operations should get around.

The companies with the most overseas presence are facing stronger international competition in the coming years, because of the contraction in traditional markets that have cut their military spending and the emergence of global competitors. That is why companies will have to force themselves to compete outside their habitual markets, in those where the demand for defence and security equipment is maintained or growing. Demand has to be sought in emerging countries which, for geo-strategic reasons, are increasing their capacities.

The most needs to be made of the Community framework, pushing forward with multi-national projects that support the international dimension of the industry. Collaboration between countries contributes to specialization and capacity building in the industry for getting access to other markets, the unification of requirements and for the qualitative leap forward in technological capabilities of the companies taking part.

It is in this setting that the key industrial capabilities for operations, and those that make up the essential elements of the defence systems that provide strategic military capabilities – as defined by the Ministry and backed by the government – need to be projected. This should help overcome the difficulties in competing in the big international defence markets and make good the big weaknesses. It would be done through an investment drive that changes and defines the industrial structure of this sector in our country around technological development, increasing competitiveness and obtaining financing tools that produce a major switch in industrial policy as a whole and in defence in particular.

The strategic industrial capabilities should help introduce a new industrial cycle from economic and technological perspectives. That is why it is essential to have a specific national policy for defence R&D and innovation. This policy should coordinate with national and European policies and, preferably, be oriented towards applied research and developments.

Maintaining one's own capabilities and having an industrial and technological base that supports high added value technological capabilities and business fabric will boost the future, post-crisis economic model. The industry must diversify activities towards the civil sector and security, and towards emerging markets, while a change in economic cycle that reactivates demand for defence equipment takes place.

Both for its strategic nature for security and defence and its importance to the Spanish economy, it should not be seen as a special sector that is separate from the national economy but one that is integrated in industrial, technological and commercial plans.

With regard to budgets, in the medium to long term future Spanish industry will have to play a more important role in the new economic model that the institutions and economic and social stakeholders are seeking. That will require a strategy to reorganize and concentrate businesses in the sector, similar to what has been done in France, Italy and the United Kingdom. Also, the fabric of alliances and cooperation will facilitate consolidation between companies of the same or a different size.

The priority is to recover what has been lost in equipment and operability. To achieve this, and with the goal of covering all the necessities of Spanish society (education, health etc.) it is essential that there is growth in public income. That is where fiscal policy is a fundamental factor. For these reasons, among the recommendations for the government and Spanish industry, we would like to highlight the following²⁹:

- The public sector should push for the reorganizing of the sector, to consolidate an industrial base that ensures the benefits of the public services of defence and security and which also contributes to the national economy.
- It is essential to establish a real alliance between government and the defence industry, one with a sense of continuity that deals with and provides answers to the challenges and opportunities that arise from the new Common Security and Defence Policy of the European Union.
- The survival of the sector is linked to the creation of a «national industrial pole», that is to say a large consortium of the main companies in the industry in Spain, with the backing of the state as a shareholder.
- At the same time, it is necessary to work on recuperating the levels of investment in equipment as soon as the general economic situation allows. Because there is no defence without a defence industry and there is no defence industry without defence equipment.
- There is a need to draw up a strategic plan for the internationalization of the defence industry, one that has an annual programme to carry out and that can be followed and evaluated.
- With a view to winning more of the international market it is necessary to increase the weight of the state in the value of the international bids, through the development and implementation of government to government accords.
- Effort is needed to identify the financial instruments for supporting internationalization, and that these surpass the existing limitations for the defence sector.

²⁹ Included are some proposals from the publication *Propuesta para la reestructuración del sector industrial de la seguridad y la defensa en España*°. Félix Arteaga. Real Instituto Elcano. 29 November, 2011.

- Support for investment in R&D and innovation is fundamental for the sector, involving technology centres and universities and making use of European research funds. Innovation in the sector should be given priority as part of a general plan, as has been called for in the State Strategy for Innovation and the concept of Innovative Public Buying.
- It is necessary to work on the value of innovations in the industrial process that involve long production chains and the management of complex processes.
- Develop a policy of sustainability, promoting a strategic alliance between defence and industry and integrating over the long term engineering involved in the life cycle.
- Change the current system of a single applicant in the defence market for a shared one (public-private collaboration), incorporating the private sector in the definition of public necessities.
- Broadening the business model, complementing the contracts for the production of goods and equipment with others for services. Also, to include types of broader public-private collaboration in design, financing, maintenance and exploitation.
- Universities should play an active part in defence R&D. This is seen as an incentive to university students to attract talent to the sector and also to contribute to cultivating and spreading the culture of defence.
- One of the priorities of our country's industrial and economic policies should be pushing for the establishing and sustainable development of competitive small and medium size enterprises, along with the build up of key technologies in this field.
- SMEs are important, as much for their economic contribution as for their support role in innovation. That is why they should participate in defence R&D and innovation, helping facilitate the transfer of technology between public research organisms (OPIs) and the universities.

Trade union organizations demand our participation in all areas of this framework, to deal jointly with the necessary measures directed at the anticipation of change that this industry requires. Like most of the manufacturing sectors in the country we want to contribute to strengthening mutual trust and to a model for running business which strengthens the rights of workers to take part in the strategies and development of companies.

Having an industrial plan for this sector would enable it to integrate into the national economy as a whole, to make the most of synergies with other sectors and to avoid Spanish defence losing the capability to supply critical capabilities and a business fabric of high added value.

In general, the whole of Spanish industry needs an urgent and resolute transformation. But the objective of a change of manufacturing model requires major effort on the part of politicians, businesses and trade unions. The culture of innovation should play a fundamental part, along with a high level of preparation for training people. And so should necessary changes in the structure, coordination and support for collective bargaining, so that the needs of the workers coincide with the companies' competitiveness.

Composition of the working group

- Coordinator:* **Mr. Adolfo Menéndez Menéndez**
President, TEDAE
- Board secretary:* **Mr. Víctor Pujol de Lara**
Lieutenant Colonel
Professor, ESFAS-CESEDEN
- Members:* **Ms. Begoña Cristeto Blasco**
Secretary General for Industry and Small and Medium Size Enterprises
Ministry of Industry, Energy and Tourism
- Mr. Juan Manuel García Montaña**
Lieutenant General
Director General of Armament and Materiel (DGAM)
Ministry of Defence
- Mr. Arturo Alfonso Meiriño**
Brigadier General
Deputy Director General of International Relations
Ministry of Defence
- Mr. Antonio Fonfría Mesa**
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- Mr. Máximo Blanco Muñoz**
Secretary for Industrial Strategies
CCOO Industry

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