

# THE MOBILIZATION OF THE DEFENSE INDUSTRIAL BASE IN SOUTH AMERICA THROUGH THE BRAZILIAN ADMISSION IN THE NATO CATALOG SYSTEM

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## Introduction

Modernity has brought the progress of science and technology applied to the instruments of use of force. Before they were simple manufactures of shields, swords, and spears, the greater complexity of weapons required increasingly sophisticated production systems, able of handling the multiplicity of subsystems, parts, and components, in the scale of thousands and, in some cases, millions of items. The management of so many components, whether to obtain weapons systems or to maintain them, has become the object of concern and systematization and control efforts.

The improvement and use of cataloging systems is increasingly needed amongst industrial defense bases and complex markets, with products considered strategic and a chain of supplies directly or indirectly related to the bases, and of great impact in the global economy. Therefore, cataloging systems can allow the entrance in markets of producers and buyers that sharpen partnerships in other sectors of the economy, at the same time as they end

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up obliging the standardization of a series of procedures related to the quality and international demands of standardization of production.

Thus, the impact caused by the entrance of a country into a system gives it access to a relevant number of subsystems within and outside the defense product chain. If the impact of this market on economic growth has already been studied without having guaranteed reliable results in relation to this proportional relationship, the tendency to make markets more efficient has been translated by grouping more actors into common systems, with a corresponding increase in confidence.

The changes that are in progress are associated with the project established by the defense documents, after the creation of the Ministry of Defense. The National Defense Policy (Decree No. 5.484, dated June 30, 2005), updated in 2012 as the National Defense Policy (PND), was followed by the National Defense Strategy (NDT), which would assume the commitment to handle the implementation of the guidelines of the previous document. The White Paper on National Defense, under review in 2017, as well as the other documents, also notes the commitment to structure the Armed Forces “around capabilities, equipping them with personnel and material compatible with strategic and operational planning; and develop the potential of defense logistics and national mobilization.”

Among these guidelines are strategic partnerships, the integration of South American defense industries, capacity for power projection, and provision of the appropriate level of security to the country. The protocols that established this standardization and which are under the scope of the NATO Codification System (NCS) have been developed over the last few years and have made Brazil one of the emerging countries of the Global South outside NATO to join this regime evolving from Tier 1 country for Tier 2<sup>3</sup>, which allows you to disclose your cataloging or management data to the NCS database. Other countries such as Singapore and Malaysia have evolved in this direction before Brazil; Austria, Australia and New Zealand did after.

The purpose of this article is to describe and analyze the determinants and repercussions of Brazil's entry into the NATO Codification System (NCS) for the National Defense and Development National Base (agreed in April 1997). The central hypothesis is that, through this process, there was a progressive conditioning of the national defense industry, and correlates, in favor of protocolization, which extended the internationality and scope of national agents, both as buyers and sellers, within this system and subsystems. The

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<sup>3</sup> Typically Tier 1 companies offer the most advanced supply chain processes. In Tier 2 cases, companies are smaller and have fewer technical advantages than Level 1 companies and, while no less vital to the supply chain, are more limited in what they can produce.

analysis of the process of inclusion of Brazil in the NSC and the characteristics and purposes involved and the analysis of the repercussions for Brazil. To do this, before the analysis of the repercussions, there is an explanation of the method used, once the objectives of the article consolidate through a medium-term prospective vision.

## The cataloging system adopted by NATO

Brazil started to have a greater demand for managing defense systems from the end of the Second World War, when an extensive number of products and partners were included in the market along with the demands of post-war reorganization. Nevertheless, the cataloging system that began in the United States was incorporated by Brazil only in the late 1960s, with the creation of the “Permanent Commission for the Cataloging of Materials” by the Joint Chiefs of Staff of the Armed Forces (EMFA). Already in the 1980s, efforts were directed to the creation of the catalog management system, which came into operation in 1982, under the name of Military Cataloging System (SISMICAT). The standardization of this system in accordance with the precepts of organization of the catalog adopted by NATO takes place in 1986, but between 1987 and 1994 the Armed Forces develop their own systems of administration of defense products.

The cataloging model gained institutional status with the creation in 1998 of the Armed Forces Cataloging Center (CECAFA), one year before the creation of the Ministry of Defense (MD). From this, understandings were developed with the main member countries of NATO so that the CECAFA could act based on regulations already practiced. Changes in the management of CECAFA occurred during the consolidation period of the Ministry of Defense until it was renamed CECADE (Defense Cataloging Center), as well as the SISMICAT renamed SISCAD (Defense Cataloging System). In 2017 the prioritization of the theme motivated the creation of CASLODE, namely, the Support Center for Defense Logistics Systems, where cataloging is one of the tasks. These latest changes occurred in compliance with the new legal framework of the Industrial Defense Base<sup>4</sup>.

The *NATO Codification System (NCS)* represents, in addition to a product catalog, a logistical planning object that has the scope to modify national systems of purchase and sale, given the requirements of payment, membership and standardization, intrinsic to participation in this system. The collection method associated with the catalog can be divided between collecting

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4 Law n. 12.598, that establishes development mechanisms to the brazilian defense industry.

data, sorting, identifying, coding and establishing the NATO stock number. In this system, operators identify Brazilian companies and products by the letter “K” (companies) and by the number “19” (products). The classification system derives from the *NATO Codification System (NCS)* of the U.S., improved after World War II, introduced in NATO in 1958 (Hunter 2009). What used to be a platform for international operations to ensure that the military in operation has the required item in the right time, has gained more scope today (Hunter 2009).

The extent of products in the catalog is large and offers service providers and users greater clarity of item availability and possible windows of opportunity for the development of derivative and / or complementary technologies (Taylor 1982). For the purposes of autochthonous defense development, availability ensures visibility in commitments whose amounts are relatively high and long term, due to the aggregated technological factor. The main concept attributed to the evolution of the on-screen system is that of rationalization, since it unites efficiency of the product to the efficiency related to the cost of production and its logistic chain (Taylor 1982). The model in question is governed by the *NATO Group of Directors on Codification (AC / 135)*.

The ongoing processes that are the subject of this study are endowed with a system that had adherence to the defense sector known as “*Enterprise Resource Planning*”. ERP is not only a data integration model for organizational management efficiency but, in the defense economy sector, it allows the interpellation of public and private individuals to build a more efficient logistics base than before. It is therefore necessary to observe the current model in the case of the NATO cataloging system with regard to processes, logics and expectations of results that matter to both defense economics studies and Brazil’s inclusion in this scenario for the coming years.

Although we recognize that certain options in this theme have an intrinsic political character, the interest in being in the catalog derives from the search for greater projection and efficiency of Brazil’s industrial defense base (IDB), whose variables are predominantly commercial, technological, and economic. Embraer is an example of a company that, being in the European market and having branching in Portugal, had to adapt itself to the requirements contained in the catalog system and to the life cycle of the products (for the sale of the KC390).

Thus, this admission ends up widening the interests of NATO members, and can bring positive results for Brazil in the coming years. A country can make use of the catalog, but it must make the request to be a member and insert its industrial base, having access to the logistical management system that allows organizing the life cycle of its base of defense. It is important to

emphasize that the essential thing is to evaluate the importance of the cataloging system undergoing for the IDB, regarding the determinants of this process and the expected results. The political implications will be the result of speculation of the expected results of economic origin here exposed to the end, in the form of four scenarios derived from the combination of expectations of growth or crisis in Brazil and the NATO System.

The so-called *Master Reference Catalog for Logistics (NMCRL)* is a project coordinated by the NATO Procurement and Support Agency and represents a large base of inventories of defense products and services in the world. The existing system has about 28 million units and more than 17 million items numbered, revised and expanded every two months (here considering companies registered by governments). The software services available for cataloging between NATO partners are categorized as *commercial off-the-shelf (COTS)*, for those whose use can be exercised immediately and in any conditions they are, or *government off-the-shelf (GOTS)*, made especially for governments<sup>5</sup>. The first one has commercial use only, and the later has access to softwares developed by the governments of Australia, Spain, Bulgaria and Italy, already used by other actors of the NATO system.

Other indexing programs are part of the NATO structure, such as those linked to the *NATO Support and Procurement Agency (NSPA)*. Under the control of the NSPA, the *NATO Logistics Stock Exchange (NLSE)*, for example, functions as the exchange of assets that are in excess; reports on the military to improve asset management; management of common stock and virtual stocks; the processing of emergency support from NATO, including the liquidation of financial transaction in progress. The issue of examples is an element of differentiation because the catalog enables the mobilization of items that are available to eventual groups that are considered virtual, given that they are able to anticipate solutions based on exceeding stocks from multiple actors (Koch Rodoseck 2012; Barbarello et al., 2000).

In turn, the services included in the Catalog - where Brazil is inserted now, and precipitously, a platform based on a cataloging method - are divided into weapons systems, logistical services such as projects, softwares and operational logistics.

The Brazilian option for the MC Catalog (*Material Codification Catalog*), one of the three of the COTS categories of commercial base, is the most adopted option (19 out of the 47 catalog members), and deals with a trading system developed by the Czech company AURA, with friendly and web-

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<sup>5</sup> See presentation of the Ministry of Defense to ABIMAQ - <http://camaras.org.br/Arquivos/Download/Upload/2025.pdf>, accessed June 8, 2018.

based<sup>6</sup> interface. After Brazil's implementation of the system, the country participates with access to the products and services offered, but also as a classifier agent of Brazilian industries for services and products included in the catalog. Such a system obliges Brazil to record production, information and supply standards for the defense and security market, making the country a "quasi-complete" participant, since it is not a member of the NATO system.

If this inclusion in the Catalog is the object of interest in the aspect of the economic diversification and internationalization of Brazil and its industrial base, as foreseen in the defense documents, the scope of this representation can have effects in other important areas such as interoperability between Armed Forces, regional integration and relations with neighboring states, bilateral and multilateral relations with NATO actors, among other aspects not yet estimated.

In the United States, a report addressed, in 2002, to the *Subcommittee on Readiness and Management Support Committee on Armed Services* of the Senate, by the *United States General Accounting Office* focused on efforts to manage competition and raising prices by the Agency of Defense Logistics (DLA). At that time, the key concern was the decline of the NATO system and the possibility that efforts at innovation could continue at the same pace as in the Cold War, since in the ensuing period the effects of disarmament could be felt by the US in terms of development (Cooper 2002).

The visible concern in the report was that prices could reach a reasonable range between cost and return of the development (*ROI – Return on Investment*) (Cooper 2002), by updating the logistics base for linking producers and buyers. Criticism of earlier systems was directed at low upgradeability and thus little reflection on the price patterns of the ordinary world. In addition, an information system that would ensure exposure and competitiveness could be highly productive for the United States purchasing system. As it is one of the most complex systems in the world involving producers and buyers, including multilateral and bilateral relations, the cataloging system adopted by NATO has implications for inside and outside the structure of that organization.

Brazil is inserted in the system for different reasons. With the end of the Cold War, the role of the actors in the international system was being reviewed, even, of the regimes with military effect. The North Atlantic Alliance (NATO) Treaty, as a regime shaped by the East-West conflict, was also reconditioned to the demands of the late twentieth century, beginning with

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<sup>6</sup> To access the countries and catalog types used, go to [http://www.nato.int/structur/AC/I35/main/links/tools\\_codification.html](http://www.nato.int/structur/AC/I35/main/links/tools_codification.html)

the Bosnian War, where the imperative was already focused on peacekeeping missions (Gaddis 1992).

The Brazilian case is particular for several reasons, some of them expressed previously. As a consequence of the National Defense Policy (PND), the National Defense Strategy (NDT) and the National Defense White Paper (LBDN), the IDB regulatory framework, in which Law 12,598 / 2012 is featured, regulated by Decree 7.970 / 2013, consolidates the second structuring axis among the three established in the NDT. The translation of this commitment can be simplified by (1) the promise of making the defense system more autonomous, (2) increasing efficiency, reducing costs, and (3) ensuring greater interoperability among the armed forces. In this sense, the cataloging and mapping of this system, with a view to its internationality, can accelerate this process.

All of these conditionalities, expressed in the three defense documents (PND, NDT, LBDN), reinforced by the IDB regulatory framework, show interest in developing a model that combines the aspirations of expansion and growth with the already present features of strengths in fields like natural resources, population, territory. Although the project of participating in international fora with proportional resourcefulness has been affected by the advance of the domestic economic and political crisis, the Brazilian participation in the NATO cataloging system seems to have been a low cost investment, provided by the opportunity to defend the permanent seat in the Security Council, which would normalize the Brazilian system vis-à-vis most board members.

It should be noted that the NATO Cataloging System is composed of member and non-member countries and this configuration also changes by the time that more or less stable relations between partners in the system and outside it.

Recently, the Crimean Crisis (2014) led to the split of this system between the Russians and NATO, when Crimea was annexed by Russia and ceased to be an autonomous unit with possibilities of narrowing with the European Union (Pereira 2010). On that front, the European Union and the United States strongly supported Ukraine in facing the decision related to Crimea, which may have contributed to the Russians ceasing to join the system as supplier of a large group of items and services, now recaptured by other members of the system. But it is important to note that the countries of the former Warsaw Pact, which are now part of NATO, Hungary, Czech Republic, Slovakia, Poland, Romania, among others, and which have developed industrial defense bases with origins or support in Russian technologies, maintain relationship with the Russian defense industry. There are also the large number of countries that belong to the SOC and that employ Russian material -

Brazil is a case and India is perhaps the most relevant.

While increasing tensions in relations lead to a high degree of uncertainty about the supply and mutual trust generated by the common system of supply of defense material - another possible consequence of the degree of transparency of the system - the interdependence between these actors is hardly broken by a single system. The fact of the departure of a major actor does not imply the disruption of the system, since ties of another nature remain.

This case allows us to consider that the dynamics related to the defense economy are directly associated with the degree of proximity and trust between partners, which leads to an understanding about the system that is even more particularized (Sandler & Hartley 2001; Sandler & Hartley 2007; Mesa 2012) . This is not to say that there are no relevant tensions among actors in the system. The popular maxim that says “if not against them, join them” is also paralleled in defense economics studies of cooperative arrangements that are disproportionately formed between actors, both in terms of strength and economic robustness ( Olson 1966).

Faced with the withdrawal of a major supplier and the process of new cataloging as the responsibility of other actors in the system, new dynamics are incorporated, just as productive rearrangements also reflect relationships in the international system. It is relevant, therefore, to highlight that, despite the Brazilian defense documents between the first and second decades of 2000 reinvigorating the autonomous and developmental platform of Brazil (Dagnino 2008), in terms of foreign policy, the autonomist relations had a relevant political contribution from the last decades for both the autonomy project for integration and the autonomy project for diversification (Vigevani and Cepaluni 2007).

In the same way that the South-South proposals took place in the different political projects of Brazil of the last decades, the North-South relations also happened circumstantially by the continuity, solidity or absence of alternative, in the same period. At the same time, it is possible to defend the presence of a dominant foreign policy paradigm present in the last governments - which represented priority waves of action and distinct models of development, at a time focused on openness and pragmatic relations, and other focused on horizontal relations ( Vigevani & Cintra 2003; Vigevani and Cepaluni 2007).

In this case, relations derived from SOC insertion can fit into the scope of North-South relations, whose dependence weights cause an expectation of disproportionality and limited ability to change status by smaller actors. On the other hand, non-insertion into universal systems such as NATO can



leave these same actors out of competition with any portion of that system. Moreover, with respect to tensions, they continue to exist and occur despite the participation of these and other systems of cooperation which, depending on individual actors and interests, are constantly under review. While the 29 NATO countries are present, there are 13 countries in the Tier 2 category, and another 21 in Tier 1<sup>7</sup>, making a total of 34 non-NATO countries.

## Challenges of the Cataloging System for Brazil

Within this context, one of the initiatives had as an objective to seek the knowledge of the productive chains so that a project of knowledge management on the Industrial Base of Defense (Knowledge of the Business Base of Interest of the Defense) was proposed. This project is currently underway between the Ministry of Defense and companies, whose applied development model sought, among other objectives, the resumption of the surface ship industry, providing an efficient relationship between the Brazilian Navy, Ministry of Defense, on the one hand, and suppliers on the other. The initiative did not target only naval assets, it focuses on all products classified as strategic and defense (PED / PRODE) of companies within the Joint Commission of the Defense Industry as a defense company (ED) and strategic defense company (EED). The Defense Equipment and Articulation Plan (PAED) has in cataloging a mechanism to boost Brazil's technological and logistic capacity, mobilizing knowledge about: exports, imports, identification, companies, production chain, relations with other agencies such as Federal Revenue Service, applicability data, standardized technical data, related economic activities, among others. The regulatory framework of the Industrial Defense Base (IDB) provides this obligation for cataloging.

The context in which the defense documents were made pointed to the growth of Brazil in the scenario of emerging countries, in a period favored by both economic cyclicalities and greater political stability than before (Dagnino 2008). From this context emerged the need to project new opportunities through possible international partnerships.

In 2013, Decree 7970<sup>8</sup> established the creation of the Joint Commission of the Defense Industry - CMID, "with the purpose of advising the Minister of State for Defense in decision-making processes and in the proposal of

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<sup>7</sup> Available at <https://www.nato.int/structur/AC/135/main/links/contacts.htm>, accessed May 10, 2018.

<sup>8</sup> Available at [http://www.planalto.gov.br/ccivil\\_03/\\_ato2011-2014/2013/decreto/d7970.htm](http://www.planalto.gov.br/ccivil_03/_ato2011-2014/2013/decreto/d7970.htm), accessed May 10, 2018.

acts related to the national defense industry". With this in mind, referring to the provisions of Law 12.598 of 2012, the Joint Committee was characterized by treating the matter for the first time on the basis of the interministerial relationship. In coordination with the SISCICAT (Military Cataloging System of the Armed Forces), the current Defense Cataloging System (SISCADE), the NATO catalog strengthened compliance with the metrics, since the expansion to this market could meet demands previously focused on the monopsony of the government (Sandler & Hartley 2007). In addition to the Catalog, compliance with the normative foundations of the Product Life Cycle, developed by AC327 within NATO, would ensure the IDB's internationalization standards required by NATO.

By means of the aforementioned Decree, standards were established where companies registering defense products and strategic defense products enjoy the *special bidding term*, as part of the federal promotion to the sector, for the purpose of the acquisition system.

The mapping and control of the IDB, coupled with the opportunity of the catalog, can provide an integrated model with repercussions on the optimization of uses between the Forces of the same objects in a way not previously seen. From the frameworks created in Brazil, the concepts of product, defense base, differentiated system of bids for strategic companies, through the creation of a special tax system. The catalog system of defense industries (SISCADE - System of Defense Cataloging) refers to this development.

The system in question was also implemented with a focus on the alignment of the supply chain with the industry system, so as to also enable the articulation of a logistics plan for the defense system. The main problem arising from possible misalignment is that systems and subsystems can create high dependency when there is no cataloging, so that an asset can become inoperative if a product is not available to the planning at the exact moment of demand. Thus, cataloging can fill this role by giving visibility to the planner (Taylor 1982; Ourts 2003). This includes processes related to product lifecycle management, in which Brazil participates more recently.

The visibility of defense industrial bases is the main task of the NATO catalog database. Sixty-three (63) countries are part of the catalog, among those in the NATO system and elsewhere. Depending on the type of participation, countries outside the system may have access as registrars or may only be consultants. On this basis there are currently about 34 million items cataloged through the scheme described above. Of the users, about 28 million participate in this system.

Among the registering countries, Brazil has about 1.1 million items cataloged. Currently, there are 3000 companies that exist in the system, from

mobilization companies, logistics, to defense products<sup>9</sup>. A set of agreements (as a cataloging clause) benefits the system, which is controlled by the NSPA, a NATO agency located in Luxembourg. The requirements for a country to participate in this system begin with the creation of its own system, just as Brazil did through SISCAD. The cataloging systems of the Armed Forces remain under SISCAD, where the participating companies were authorized by law to participate in the system, as is the case of EMGEPRON and AVIBRAS.

Brazil is part of the National Cataloging Directors Forum of NATO that happens twice a year, the Brazilian director of the catalog being responsible for communication with NATO. In addition to participating in the NATO cataloging system, it allows continued access to the most diversified and secure supplier base in defense matters, Brazil is allowed to register Brazilian and partner country products and services, which significantly increases the use and possibilities to the national IDB. From the institutional point of view, it is the Logistics and Mobilization Office and the Secretariat of Defense Products that work more directly for the benefit of the catalog. There is a governance structure for the SOC: forum of national directors of cataloging (in the case of Brazil, the director of CASLODE that answers by the Brazilian NCB - National Codification Bureau); Pannel A - system evaluation; TSG, Transformation Steering Group - conceptual and technological transformations in the system; and Strategy and Business Committee, BSC. Brazil participates in all forums.

The most relevant feature of the process is, of course, Brazil's capacity to be present in the NATO Catalog through its companies and, in particular, as a lever of companies from partner countries. A recent example was Sweden, until recently a NATO Tier 1 country that used services from Norway, a member of NATO, to enter its products into the SOC. The process of evolution from Sweden to country TIER 2 in the SOC, considering the view of the Gripen fighters to Brazil, can also be cited as a chain effect.

For regional initiatives, the issue of cataloging has been discussed in detail, involving countries present or not in the Cataloging System - such as the regional *Pacific Area Cataloging Seminar* (PACS), where several countries of the Pacific Basin participate, and Australia and New Zealand have more initiative coordinating; we can also mention the *Nordic Defense Cooperation* (NORDEFECO), formed by Nordic countries. Therefore, it had been suggested that South American countries be convened by CATSUL (Permanent Forum on Cataloging of Countries of CDS UNASUL), where cataloging responsibility would be from Brazil (as Tier 2 country) and Chile would assume the first presidency. Since the creation of the group, the South American Seminar (the

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<sup>9</sup> Available at [https://www.egn.mar.mil.br/arquivos/cepe/seminario-3-2016/CPLP\\_Workshop\\_26OUT2016.pdf](https://www.egn.mar.mil.br/arquivos/cepe/seminario-3-2016/CPLP_Workshop_26OUT2016.pdf), accessed May 10, 2018.

first in Buenos Aires, 2014) had the role of promoting the development of logistics in the creation of common axes of discussion<sup>10</sup>. From this, a reference term was set up to establish the basis of group work. Among the central objectives are the expansion of logistics interoperability, the integration of industrial bases, and the establishment of a single cataloging base for a common language among South Americans.

The expected economic momentum with this type of initiative is the possibility of creating a common base of investments, which was observed by the study of the Brazilian Unmanned Aerial Vehicle (ANV) production model and the construction of aircraft by Brazil and Argentina. One possibility for the development of this integrated model is related to the manufacture of Patrol Ships.

Nowadays, Peru, Chile, Colombia and Argentina are also part of the UNASUR group of catalog standardization, where Brazil is a mobilizer and inducer of cataloging. Brazil manages its base through the cloud of the Cataloging System that is located in the Brazilian Army, where the cyber defense function is concentrated. The accessibility of the catalog over the internet makes the catalog consultable and manageable between partners, although the care with this deposit is high.

As a tool for the knowledge of the defense industrial base, the subsystem that integrates the NATO Catalog enables the dissemination and knowledge of the products and services available, laying the foundations of a platform for the IDB's knowledge management. In this case, as well as in the existence of particular Forces management systems in the 1990s, the creation of integrated subsystems specializes in supply and qualifies defense demand. An example of this is the effort to create a proper subsystem between Embraer and the Air Force. The Guide for Defense Products and the Catalog of Companies of Strategic Interest in Defense are by-products of this database system, and this contributes to the national mobilization system - linked to the same Secretary of the MD, which subordinates the cataloging system. Another initiative that may be cited as a correlative was the creation of a working group for the entry of the Ministry of Defense in CAMEX (Foreign Trade Chamber), which in turn is part of the Ministry of Industry, Foreign Trade and Services (MDIC), having spent one year under the scope of the MRE (Itamaraty), between 2016 and 2017<sup>11</sup>.

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<sup>10</sup> See Termo de Referência do Fórum Permanente dos Países do CDS UNASUL sobre Catalogação.

<sup>11</sup> Available at <http://www.mdic.gov.br/noticias/2431-camara-de-comercio-exterior-volta-para-o-mdic>, accessed May 10, 2018.

One of the cases cited in meetings promoted by the Federation of Industries of the State of Rio de Janeiro (FIRJAN) is the formation of clusters focused on the Economy of the Sea, since one of the challenges brought about by the formation of the Catalog was its use for the construction of patrol vessels. In the case of maritime clusters in a large coastal country and considerable economic activity, clusters involving research institutes, fishing industry, hydric basin, waterway transport, water sports and leisure industry and repair industry may justify the incentives to make these investments.

The Sea Economy is one of the booming sectors and its organization has been derived from studies that point to a redirection for investments associated with maritime capacity associated with naval (Stavroulakis & Papadimitriou 2016). Such incentives have been revealed by the readaptations in the defense industry, where both the assets must increasingly be associated with diversified performance, as well as their effects-based constructions and overflow to related and indirect sectors where more sectors can be included as participants in this basic economy of the NATO Catalog.

Thus, the warlike naval industry can be benefited by the Economy of the Sea in Rio de Janeiro, for example, where these ideas were concentrated, through the participation of the State and private capital. The PAED encourages this interaction, regarding the resumption of the naval industry. The “Tamandaré” corvette project points in this direction and encourages the participation of the private sector in this industry. It is a new class of ships that takes advantage of the experience of corvettes previously produced in Brazil, especially the Barroso class.

One of the incentives associated with the construction model of a maritime cluster around the construction of patrol vessels or the Tamandaré corvette can be explained by the Input-Output Analysis model. This model was used to assemble a matrix of products, dividing the economy into economic sectors (about 110 sectors) and calculating the flows between sectors based on the technological and production intensity. As an example, the “Tamandaré” corvette would use 34 economic sectors, which means a high impact on other economic activities. In this case, they are determining variables for the project to be framed with socioeconomic impact: product, product value and employment level. In this case, the corvette, whose current price would be about 1.5 billion reais, would return the investments<sup>12</sup>. The multiplier effect

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12 Available at <http://defesaeseguranca.com.br/marinha-vai-investir-us-r8-bi-nas-novas-corvetas-classe-tamandare/>, accessed May 10, 2018. On the input-output matrix and impacts on the cluster economy see: <http://defesaeseguranca.com.br/marinha-vai-investir-us-r8-bi-nas-novas-corvetas-classe-tamandare/> [http://defesaeseguranca.com.br/wp-content/uploads/alte\\_edesio\\_apresentacao\\_grande\\_abc\\_dez2012.pdf](http://defesaeseguranca.com.br/wp-content/uploads/alte_edesio_apresentacao_grande_abc_dez2012.pdf), accessed May 10, 2018.

on salaries, maintenance and facilities, also happens for each ship, generating about 7000 jobs.

Nowadays, two clusters are worth mentioning in Rio de Janeiro: the one associated with the Itaguaí complex, aimed at the construction of conventional submarines and with nuclear propulsion; and the older Navy Arsenal, which has faced challenges stemming from limited investment opportunities.

Thus, they can be identified as processes associated with the cataloging system: organization and governance. As a result, the biggest desired effect of the catalog is the expansion of the potential of product registration for supply chain control and the management of the media maintenance system. This would make it possible to create a doctrine on life cycle management, based on the integrated knowledge provided by these initiatives.

## **International Political Economy, Defense Economics and the model for analysis of the repercussions for Brazil of the admission in the NCS.**

The study presented here requires the detection of the cataloging model developed by NATO, and of the processes that allowed the insertion of Brazil into the system. For the principal axis of the research, the method chosen is the case study that, although it offers limitations as a method to consider an ongoing system, it would not be appropriate to make this a comparative study, since there are no similar significant cases regarding their variables. The main confrontation of this problem occurs because the proximity between the dependent variable - the catalog as representative of a process of amplification and strengthening of partner actors - and the independent - the system and how it happens, are too close.

“(...) Such biases can occur when the researcher selects cases that represent a truncated sample along the dependent variable of the relevant universe of cases (...). In statistical research, the standard presentation of selection bias suggests that a truncated sample typically understates the strength of the relationship between the independent and dependent variables (...).”  
(Bennett 2004, 48)

Although such proximity is referred to as a possible bias on the object - the NATO Catalog - the opportunities to emphasize institutions, through processes and routines that have an impact on the international system and its actors - are not reduced, inside and outside the aforementioned object.

On the other hand, if the case study can offer us the process, the economic and political impact cannot be observed only in light of its institutional constraints, in general, too bureaucratic. The main element to be considered here is the hypothesis that microprocesses create routines and institutions that, conversely, recondition larger political relations. This effect on foreign policy has been observed through technical cooperation, horizontal cooperation or incremental institutionalism in international relations (Bevir 2008). Otherwise, it is also important to consider the constraints of a hegemonic actor such as NATO.

In these conditions, it seems pertinent to use the International Political Economy taking into account institutionalist arguments. Although the Hegemonic Stability Theory (HST) model can provide starting elements that strengthen the particularity of the NATO case, it should be recognized that there is a limiting role in institutions created under a functionalist model. The point of contact between these methods can be explained by: 1) the fact that the model of the NATO Catalog has the sign of a project constituted in the form of a complete military alliance and whose hegemony is expressed by the economic robustness of that partnership and of its members; 2) by the need to apply consensus of institutionalist theory and cooperation, in which architecture and processes matter, and cooperative ambience generates roles that increase the cost of exit from the project (Gulati and Singh 1998; Moravcsik, 1999). That is, if there are elements of hegemony in action with cooperative and institutional elements, the environment is defined as hybrid and therefore observable through methodological spectra also hybrid or combined. You can find this proposal in Moravicsik:

Still, if the most important binding restrictions in efficient international cooperation are indeed national and transnational, not interestatal, it seems plausible to conjecture that an important source of self-sustaining international cooperation, even when faced by “inconvenient” compromises, it’s not power concentration only, as proposed by the Hegemonic Stability Theory, nor the construction of strong international institutions per se, once that the theory of function regime tends to emphasize, but the social and political changes, national and transnational, that “block” cooperation, encouraging social adaptation that is hard to reverse - an consistent argument with liberal international relations theory (Moravicsik 1999, 302 – own translation).

Therefore, following this choice, the theoretical option is determined by the presence of a cooperative environment, observed under the leadership of some - with predominance of one of them, the USA - and other states con-

sidered to be carpool (Olson 1966). It is important to observe this system as part of the choice, since the apprehension of the case seems to be strengthened by an empirical analysis that holds this premise. And through it, it is possible to understand the dynamics and resonances of the process, including, for Brazil, through this insertion as a quasi-actor of the cataloging system (not being a member or associate of NATO).

The main consideration of the HST theory regarding the stability of the system as based on hegemonic power can also be considered, but as a method, it is important to conduct the process as part of the system where this driving force ponders and where the other states have lower chances and options. Having said that, knowing the lack of mobility in relation to the alternatives, Brazil, constituting a possible and external actor, is an unprecedented experience that should be better observed if considered such conditions previously explained.

International Political Economy, in this case, allows us to observe the object without the precise definition of a dependent variable and independent variables, so that the relations between the markets and the political conditions of the case matter (Milner 1998, Milner 2004, p.285 Gilpin 2016). However, another relevant aspect that can subsidize us is cluster economics and what network policy teaches us about creating exponentially important relationships from early links (Porter 2003).

Although the economic and political conjuncture is marked by a variable and unstable dynamics, it is possible to start from possible conjunctures that weigh both the Brazilian scenario and the international scenario in which NATO is inserted, once endowed with the previous premises based on uncertainty. In this case, our proposal is to combine the two scenarios, in the combined formulation that allows us to conduce the driving forces in relation to the scenarios that we highlight as most relevant to this study. Thus, as a result of this combination, we will highlight four possible scenarios that we will present to the respondents of this study, in view of the driving forces resulting from our observation about the NATO Codification System (NSC) and the Brazilian incidence of this movement.

Exactly because, at the time of 2017, the Brazilian scenario for the coming years is of low expectation of growth and, in addition, there are doubts about the health of the NATO model as a balance of contribution among actors, the insertion of Brazil in this system under conditions of low competitiveness and low level of investment may be different than planned. Certainly, the alignment between planning and future scenarios is even more decisive in the case of defense systems, because the long-term imperative is more affecting the defense economy than other highly variable and short-term econo-



mies (Mesa 2012; Sandler & Hartley 2001; Sandler and Hartley 2007).

Since our task is to highlight a case of relevance and try to propose possible scenarios that have implications for Brazil's defense policy, our proposal starts from the cross between:

At NATO: (1A) a revitalization of the system with increased trust and redistribution of costs more proportional to stakeholder participation and size; (2A) the decay of the military alliance model, with increased dissatisfaction with NATO and the crisis of cooperative regimes, with skyrocketing costs.

In Brazil: (1B) a scenario of frank recovery associated with the growth rates of developing countries from the next years; (2B) a scenario of continued crisis in the coming years with low growth.

Considering the literature relevant to NATO (Olson 1966, Sandler and Hartley 2001) and the recent political-economic crisis in Brazil, respectively, the manifestation of these themes through these scenarios can help, in conjunction with the driving forces highlighted by this research and presented then, in the construction of possible scenarios, associated with the consequences derived from them.

## Indicators and results

For this work, a study was conducted aimed at the preparation and observation of possible scenarios involving the participation of Brazil in the NATO Codification for the next years, as indicated below:

|   |
|---|
| Scenarios   |
| 1B + 1A = Brazil stabilizes and thrive + NATO strengthens   |
| 2B + 2A = Brazil grows little or nothing + NATO weakens     |
| 1B + 2A = Brazil stabilizes and thrive + NATO weakens       |
| 2B + 1A = Brazil grows little or nothing + NATO strengthens |

|   |                             |
|---|-----------------------------|
| Forças motrizes ( <i>driving forces</i> ) |                             |
| Tr  | Transparency                |
| Ot  | Economic Scale Optimization |
| In  | Internationalization        |
| Op  | Interoperability            |

In addition to the interviews with professionals directly related to the process in question, we used the focus groups model among specialists in the area of administration and logistics, international relations and defense and military history. The focus groups methodology has already been present in the literature from psychology and sociology for some decades as a way to gather information, impressions and opinions in a systematic and productive way, because based on the premise that respondent agents cooperate more efficiently in group than by individual interviews. (Kind 2008). The use of this methodology is largely related to public administration (Schröder and Klerin 2009) and private, especially when it is necessary to detect processes and improve them in the short and medium term, using groups of up to 12 experts or SME's (Subject Matter Experts) . Alternatively, a specific group of consumers, suppliers, employees may be considered experts, depending on the research in question. Its application in studies that call for prospection can be observed in McClure and Bertot (2001), by which possible scenarios and data were collected through this method.

Together with our interviewees - groups of up to six people with expertise or defense knowledge and experience considered high or very high in the field - we evaluated the incidence in these scenarios of elements associated with the four (4) driving forces highlighted as the leading for Brazil in the admission on this system. In political-economic scenarios of growth and stability and / or crisis and destabilization for both actors, Brazil and NATO, the driving forces indicate elements that translate the expected results, sometimes more likely to occur, and other times less likely. Therefore, it should be noted that these driving forces behave as possible gains, because they are considered motivational factors of the Brazilian admission proposal in the system.

However, there are a number of side effects that also fulfill expectations of this insertion and that can also be listed, in disposition with the expected results and proposed here. These results are listed with special focus on the expected results, such as local and regional clusters, and the incidence for the Brazilian regional performance. This is because the proposed model is part of a foreign policy proposal whose Brazilian preponderance in the regional scenario would increase regional stability. In addition, Brazilian participation in protocols and a high internationalization system would broaden the emerging qualification among the main actors of the international system (Vigevani, Oliveira and Cintra 2003; Vigevani and Cepaluni 2007).

The first scenario is qualified by the good economic development of Brazil and by the revision of the NATO system with positive repositioning in the face of contemporary demands.

The second scenario is marked by the continued destabilization of both the Brazilian economy and the country's development capacity, as well as by NATO to retake itself to the demands and criticisms of its system, given the new national policies of its main actors or the international scenario.

The third scenario is marked by the recovery of Brazilian growth at reasonable rates for developing countries (from 2% to 4% pointed out by international institutes such as Oxford Economics by 2020). In the same scenario, it combines the NATO crisis with the contemporary dilemmas of costly maintenance of an alliance and the existence of other more efficient mechanisms for the effect of international security problems, more liking for the member countries.

The last of the scenarios is perhaps the most critical. In Brazil, Brazil is still suffering from the extensive economic crisis, with a small capacity to meet previously planned long-term investments and to strengthen its defense sector based on government procurement and public incentives. Otherwise, NATO still resists, however, in the face of political transitions arising from the rise of new governments less focused on collaborative strategies, the financial arrangement of its support is weakened, as the character of its missions is progressively contested.

The document *Brazil 2035*, prepared by the Institute of Applied Economic Research (IPEA) in conjunction with the National Association of Planning and Budget Career Officers (ASSECOR), was launched in June 2017 and featured a work developed over the last two years, led by the researcher Elaine Marcial, who has worked for years in scenario construction. The effort, which brought together a number of institutions and researchers from various fields, including defense, has some results that may also matter to the analysis proposed here. The chapter on the Political-Institutional Dimension has, in the sub-theme "International Projection", conclusions that point to the integration of South America and the emergence of emerging countries as keys to the transition of the international system through which Brazil passes. The continuity of the cooperative dialogue is shown on the basis of four historical examples of cooperation between South American partners, bilaterally or multilaterally, such as the creation of the South American Defense Council (CDS), or, in the nuclear sector.

Considering that Brazil continues to be a "fearful leader", according to the document *Brazil 2035*, it suggests as the most relevant factor the timidity of investment by integration. In short, the assertion that the international system is in transition would cause "key uncertainty whether Brazil will benefit from an international power system" (*Brazil 2035*, 167).

Another relevant conclusion is that, despite the continuity of the lim-

ited electoral engagement of foreign affairs and defense affairs, another key uncertainty and “whether Brazil will have a development-inducing defense industrial base” in 2035, which is explained by the volatility of investments in this area and the extent of these investments in the private sector, considered fragile. Another point of uncertainty is whether the IDB will have the necessary alignment with the needs of the Armed Forces. This is because defense spending, although bulky (among the top 11 in the world) does not represent a flexible amount relevant to investments. In this case, extrabudgetary resources are usually committed, in addition to the tax incentives that end up representing other gains in this matter as well.

The results generated by the *focus group* point to the importance of the Brazilian projection, first, regarding the standardization of the defense and production system, which improves the production metrics in the medium term and increases the desire of projection with economies complementary to those already available in the NATO platform. Openness to new markets was a factor cited as being of great relevance both to the effect of the Brazilian growth scenario and to the crisis, since the breakdown of monopsony (a single buyer) seems to be the way out of the sector’s sustainability. In this case, it would weigh the positive domestic return, which could be achieved by standardization and large-scale exports. One factor cited as relevant by the group is the fact that the companies that make up the industrial base are mostly small and medium-sized enterprises with limited capital to sustain periods of crisis or long-term investments without sustainability. This element seems to be even more relevant if it occurs in a scenario of economic crisis in Brazil, where correlated expertises are identified in the national market and could be available to the external market in a systematic way.

Otherwise, the combination of Brazil’s growth scenarios and NATO crisis scenarios could shape the most compromising prospects. Having as its principle the diversification of its foreign policy model, a question that arises is whether NATO regulations serve other buyers outside this system. While the NATO strengthening and repositioning scenario strengthens the expectations of Brazil’s growth and crisis scenarios, the NATO crisis scenario prompts doubts about metrics and their varied uses for eventual exit from the system. Although Brazil is less likely to wish to disassociate itself in this scope, there are always costs associated with exit, such as the repositioning of partners and the identification of new markets.

In any case, although under the catalog as a method and database, Ministry of Defense initiatives point to this typical diversification, where not ceased, due to the catalog, negotiations with agents outside the NATO catalog China, Russia and Iran. The complexity of defense products rightly demon-

strates the need for standardization, coupled with the complexity and expansion of markets.

The intention to participate in the Security Council by obtaining a permanent seat appeared in the *focus group* as a determining factor for the option of inserting Brazil in the catalog. This seems to be an element that, even in the face of a NATO crisis scenario, could continue to be a force element for Brazil, since the catalog points to systematization and international standardization in quality, even.

Brazil's crisis scenarios and combined NATO crisis would indicate a significant and partial loss, although the process of standardization is still pointed out as necessary by the group, despite the crisis in question. It should be noted that the cost of admission into the system by companies is small compared to Brazil's investment in tax incentives and internationalization.

Thus, the driving forces characterized as transparency, optimization, internationalization, interoperability seem to be in line with this process and, according to the respondents, established as real expectations of this insertion. In this sense, internationalization appears as an initial presupposition, the transparency achieved by standardization, the interoperability stimulated in light of the registered means. The optimization seems to be a consequence of the previous processes, as well as the result. It is important, therefore, that optimization be both cause and consequence of this Brazilian insertion in the catalog, according to the respondents.

## Conclusions

The adhesion to the NATO cataloging system represents a projection that carries a partnership record, with implications for international relations, due to the progressive tendency of the combination between elements in collective defense and others focused on international security cooperation (Viana 2012). Although the dynamics of a military alliance is far from the model of Brazilian foreign relations, the subsystems created by NATO can serve to organize the Brazilian defense system, especially in relation to the cataloging and management of product life cycles.

Based on the assumptions presented in Brazil 2035 (2017) and observing the scenarios chosen for the purpose of this study, it is possible to conclude that the investment and efficiency dyad seems to be central to a more stable development project linked to the internationalization of the Industrial Defense Base. The recent initiatives regarding the negotiation of Brazil's entry into the OECD point not only to a foreign policy trend, but to the interna-

tionalization of standards and metrics more linked to development indices than before.

The presence of other actors in these processes of internationalization and standardization of protocols, which are outside the own NATO military alliance, broadens the regime's uses in optimizing the defense system and enables the insertion of countries that were not previously present. It should be noted that there are 29 NATO countries, 13 non-members and Tier 2 and 21 Tier 1 countries, making a total of 34 non-NATO listed countries.

Among the new actors, as buyers and producers in the system, are South Africa and India (configuring the IBAS regime with Brazil); Chile, Peru, Argentina and Colombia; Sweden (with whom Brazil has established one of its largest recent contracts - Gripen); Israel, Australia, Indonesia and Japan, as countries of economic robustness in terms of GDP. A relevant data for future notes and possibility of prospecting is the fact that the African countries with which Brazil recently strengthened partnership could compose an important group of users through the Brazilian platform, observing the expected benefits for the defense sector. This may be one more of the objects of this investment on the Atlantic axis.

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## ABSTRACT

This article aims to describe and analyze the conditionalities and side effects of Brazil's inclusion in NATO's Catalog (NATO Codification System- NCS) for the national Defense Industrial Base and the country's development (the agreement dates back to April 1997). The central hypothesis is that, through this process, there was a progressive conditioning of the national defense industry, and correlates, in favor of protocolization, which extended the internationality and scope of national agents, both as buyers and sellers, within this system and subsystems. The analysis of the process of inclusion of Brazil in the NSC and the characteristics and purposes involved and the analysis of the repercussions for Brazil. To do this, before the analysis of the repercussions, there is an explanation of the method used, once the objectives of the article consolidate through a medium-term prospective vision.

## KEYWORDS

NATO; Catalog; Industrial Defense Base (IDB).

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