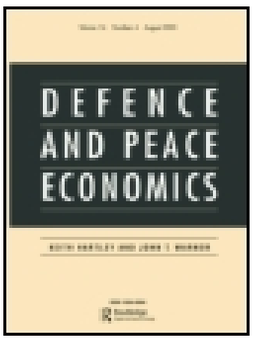


Defence and Peace Economics

ISSN: 1024-2694 (Print) 1476-8267 (Online) Journal homepage: https://www.tandfonline.com/loi/gdpe20

The Brazilian National Defence Strategy: Defence Expenditure Choices and Military Power

Leandro Bolzan De Rezende & Paul Blackwell

To cite this article: Leandro Bolzan De Rezende & Paul Blackwell (2019): The Brazilian National Defence Strategy: Defence Expenditure Choices and Military Power, Defence and Peace Economics, DOI: 10.1080/10242694.2019.1588030

To link to this article: https://doi.org/10.1080/10242694.2019.1588030

Published online: 07 Mar 2019.

DEFENCE AND PEACE ECONOMICS
https://doi.org/10.1080/10242694.2019.1588030

Routledge
Taylor & Francis Group

ARTICLE

The Brazilian National Defence Strategy: Defence Expenditure Choices and Military Power

Leandro Bolzan De Rezende and Paul Blackwell

School of Mechanical, Aerospace and Civil Engineering, The University of Manchester, Manchester, UK

ABSTRACT

In the last decades, Brazil has become a regional military and economic power in South America, accounting in 2017 for the largest defence budget in the region, the eleventh defence expenditure in the world, and almost 60% of South American GDP. The enactment of the National Defence Policy resulted in an increase in defence expenditure in Brazil that was primarily focused on developing and buying modern equipment and paying better salaries. The policy was implemented during three investment cycles that began with off-the-shelf acquisitions and moved to the execution of defence programmes aiming to develop indigenous technologies, substituting imports on the way. Despite the effort, we argue that the most likely scenario is that the achievement of the vision established in the National Defence Policy will be compromised, and that constant delays caused by the expenditure constraints might result in the delivery of outdated technologies and weapon systems, keeping a never-ending technological gap.

ARTICLE HISTORY
Received 6 August 2018
Accepted 25 February 2019

KEYWORDS
Brazilian national defence policy; Brazilian national defence strategy; security; defence; expenditure; Brazil

Introduction

In the last decades, Brazil has become a regional military and economic power in South America, accounting in 2017 for the largest defence budget in the region, the eleventh defence expenditure in the world, and almost 60% of South American GDP (SIPRI 2018b; World Bank 2018b). Most of this increase in the Brazilian defence expenditure over the last decades was caused by a transformational process driven by an emerging strategic culture in which Brazilian policymakers understood the legitimacy of the use of military power to pursue foreign policy and economic objectives. This new strategic culture toward the use of military power led to the central point of this article, the enactment of the new Brazilian defence policy framework (Brasil 2005, 2008; Ministério da Defesa 2012) and consequent reorganisation of the Brazilian defence sector.

In general, the country survey literature debating defence and peace economics is developed from a European perspective (Johnson, Hove, and Lillekvelland 2017; Beeres et al. 2012; Struys 2002; Caruso and Francesco 2012; Molas-Gallart 1997; Hartley and MacDonald. 2010; Kollias 1995; Sezgin 1997). When the debate shifts to the South American context, the focus moves to security issues rather than defence issues per se (Suarez, Villa, and Weiffen 2017), given that the continent is a relatively peaceful region and most of the threats are related to transnational and organised crimes. This scenario left the defence debate regarding Brazil with several gaps and limited to very few, fragmented and diverse topics (Dagnino 2009; Silva and Henrique 2010; Carlos and Oliveira Leite 2013; Gouvea 2015; Bildirici 2017; Santos, Gutierrez Curo, and Neyra Belderrain 2011; Correa

CONTACT Leandro Bolzan de Rezende leandro.rezende@manchester.ac.uk School of Mechanical, Aerospace and Civil Engineering, The University of Manchester, Manchester, UK

and Cagnin 2016; Neto and Gouvea 1991; Kapstein 1990; Perruci 1995). Therefore, in order to understand the characteristics of the largest defence budget in the region and the eleventh defence expenditure in the world, we build upon the country survey tradition adding to it a Brazilian perspective focused on the recent efforts to reorganise the Brazilian armed forces.

The purpose of this article is to continue our previous discussion regarding the Brazilian defence policy (why) but focused on its implementation (what and how). Therefore, the research questions raised by this article and our intended contribution are twofold and interconnected, focusing on what was implemented by the National Defence Strategy and how it was implemented. First, we examined the budget allocation choices to uncover what was implemented by the Brazilian defence policy. Second, we examined the reorganisation of the Armed Forces to uncover how it was implemented. In order to achieve the research objectives, we divided the article into five sections. First, the Brazilian defence policy framework is presented to delimitate the debate. Second, the data collection methods are presented. Third, the results section presents data regarding the general economy and the Brazilian defence expenditure, the defence budget by expenditure category, the evolution of military personnel and the defence imports over the last years. Next, with the data presented, we discuss them and answer the two research questions raised. Finally, some conclusions, implications, and limitations of this research are presented.

The Brazilian Defence Policy Framework Background

Between 2003 and 2004, during the first term of Mr Luiz Inácio Lula da Silva presidency, a series of debates regarding defence expenditure was initiated in Brazil. As a result, a surprising and major defence restructuring agenda was introduced to reorganise the Armed Forces and the defence industrial base (Dagnino 2010, 2009). The debates initiated in 2003 culminated in the enactment of the National Defence Policy (Brasil 2005), and later the National Defence Strategy (Brasil 2008) and the Defence Articulation and Equipment Plan (PAED) (Ministério da Defesa 2012). These documents form the Brazilian defence policy framework. The agenda behind the formulation of this new Brazilian defence policy framework (why) lies on a previous conversation in which we discuss its geopolitics, national security, economic development, and technological innovation goals and challenges. In summary, it aims to consolidate Brazil as a regional power on a geopolitically independent South America, develop defence capabilities addressing national security issues, boost economic development by restructuring the Brazilian defence industrial base through major defence programmes, and foster technological innovation by technology transfer agreements, mandatory local content on defence programmes, and indigenous research and development efforts.

The Brazilian National Defence Policy is the 'set of State measures and actions, especially within the military field, to ensure the defence of the territory, sovereignty and national interests, mainly against foreign threats, potential or manifest' (Brasil 2005; Ministério da Defesa 2012). This policy introduced a series of defence objectives, two which are important to the analysis in this article. First, it defined the objective of 'developing a defence industrial base to ensure autonomy in vital technologies'. Second, it defined that the Armed Forces should be structured 'around capabilities, providing them with personnel and material in accordance with strategic and operational planning'. These objectives triggered a series of debates about how to implement such objectives and later led to the enactment of the Brazilian National Defence Strategy (Brasil 2008).

The Brazilian National Defence Strategy (Brasil 2008), in turn, outlined several measures to ensure the achievement of the objectives set by the Brazilian National Defence Policy (Brasil 2005). The measures were built upon three interdependent major structuring drivers, namely the reorganisation of the Armed Forces; the reorganisation of the defence industrial base; and the Armed Forces personnel policy. The reorganisation of the Armed Forces, for instance, favours indigenous technology to support the organisation of the defence industrial base. The personnel policy, in turn, redefines the manpower numbers to support the investments in defence systems.

The objectives and strategies defined by the National Defence Policy and Strategy created several defence programmes within the time frame of 20 years that were outlined in the Defence Deployment and Equipment Plan (PAED) (Ministério da Defesa 2012). The Brazilian defence project portfolio defined by the PAED focused on key investments in nuclear, cyber and space industries, as presented in Table 1. For instance, the Brazilian Navy focused on the nuclear sector, defining as its main programmes the naval nuclear programme and the nuclear submarine, under the 'development of the Navy's Core Capabilities' programme. The Brazilian Army, on the other hand, became responsible for the cyber defence sector, although, in practice, it also prioritised the Integrated Border Monitoring System (SISFRON) as a key programme to address threats related to transnational crimes. The Brazilian Air Force, in its turn, was responsible for the space sector and defined the multi-mission fighter (F-X2 – Grippen NG), in the 'air force operational development' programme, and the transport and refuelling aircraft (Embraer KC-390), in the 'strengthening of Brazilian aerospace and defence industries' programme, as its major priorities.

In summary, the Brazilian defence policy framework started with some initial debate that later led to the enactment of the National Defence Policy. After it, the policy was further discussed, and the National Defence Strategy was published specifying how the policy should be implemented. Finally, the PAED was elaborated to realign and consolidate the defence capabilities needed and define the programmes that should be executed to develop them. Combined, the National Defence Policy (Brasil 2005), National Defence Strategy (Brasil 2008), and the Defence Articulation and Equipment Plan (Ministério da Defesa 2012) defined the assumptions, limitations and delimitations of the defence expenditure in Brazil for the next years. Based on that, we explore in this article what and how the strategy defined in the Brazilian defence policy framework was implemented.

Methods

Research on defence topics from a Brazilian perspective has grown in importance over the last few years. For several years, the lack of a policy and vision in the Brazilian defence sector attracted few

Table 1. Brazilian defence project portfolio (Ministério da Defesa 2012).

Armed Force	Defence programme	Estimated time frame	Estimated Investments (BRL millions)
Brazilian Navy	Recovery of Operational Capacity	2009–2031	5,372,30
	Naval Nuclear Program (PNM)	1979–2031	4,199,00
	Development of the Navy's Core Capabilities	2009–2047	168,020,80
	Blue Amazon Management System (SisGAAz)	2011–2033	12,016,60
	2nd Fleet Complex & 2nd Marine Force	2013–2031	9,141,50
	Personnel	2010–2031	5,015,60
	Navigation Security	2013–2031	245,10
Brazilian Army	Recovery of Operational Capacity	2011–2022	11,426.80
	Cyber Defence	2010–2023	895.40
	Guarani	2011–2034	20,865.70
	Integrated Border Monitoring System (SISFRON)	2011–2023	11,992.00
	Integrated Strategic Land Structures Protection System (PROTEGER)	2012–2031	13,230.60
	Anti-aircraft Defence System	2010–2023	859.40
	ASTROS 2020 Missiles and Rockets Defence System	2011–2023	1,146.00
Brazilian Air Force	Air Force Organizational and Operational Management	2010–2030	5,689.00
	Recovery of Operational Capacity	2009–2019	5,546.70
	Airspace Control	2008–2030	938.30
	Air Force Operational Development	2009–2030	55,121.00
	Air Force Scientific and Technological Development	2008–2033	49,923.90
	Strengthening of the Aerospace Industry and Brazilian Defence	2009–2030	11,370.20
	Development and Construction of Aerospace Equipment	2015–2030	TBD
	Support for Air Force Military and Civilian Personnel	2010–2030	3,229.60
	Modernization Training Systems	2010–2028	352.00
	Total		192,586.60

researchers. However, the enactment of the National Defence Policy attracted more researchers engaged in the debate. Given the limited publications regarding the Brazilian defence sector, we searched the literature to map the topics and perspectives used in the field, and identify the research gap. In the process, we identified that no country survey had been done regarding the implementation of the Brazilian National Defence Policy. Therefore, we collected data from several databases to identify the main aspects of the Brazilian defence sector and answer the what and how questions regarding the implementation of the Brazilian Defence Strategy.

However, before addressing the what and how questions, the general economy and defence expenditure data were presented to frame the Brazilian context. Therefore, general economy indicators such as GDP, gross capital formation, and inflation, GDP deflator were extracted from World Bank database (World Bank 2018b) and the Brazilian Institute of Geography and Statistics (IBGE 2018b, 2018a). In addition to inflation historical data, the government´s inflation target was extracted from the Central Bank of Brazil database (Central Bank of Brazil 2017). With the general economy context presented, the annual defence expenditure was presented based on data collected from the Stockholm International Peace Research Institute Military Expenditure database (SIPRI 2018b).

In order to answer what was implemented by the Brazilian Defence Strategy, detailed data regarding the three main defence expenditure categories, personnel and social security, current expenditure, and investments, were extracted from public sources. Data regarding the execution of the defence budget by expenditure category were extracted from the Ministry of Defence execution budget report (Ministério da Defesa 2018). Data regarding active military personnel were extracted from the Brazilian Transparency Portal (Ministério da Transparência 2018) and data regarding retired personnel was extracted from the World Bank database (World Bank 2018a).

The how it was implemented question focus on the programmes and weapon systems acquired, so, similar to the what question, it also uses data extracted from the Ministry of Defence execution budget report (Ministério da Defesa 2018) and the Brazilian Transparency Portal (Ministério da Transparência 2018), in addition to the Stockholm International Peace Research Institute Arms Transfer database (SIPRI 2018a).

Given that the research questions require the analysis of different sources, the data collected was presented in the results section according to their theme. Thus, the analysis was conducted in the discussion section and aimed to answer the research question, making the appropriated links with the data collected to create a coherent narrative.

Results

In this article, the Brazilian defence expenditure is presented from different perspectives. First, we introduce the topic describing the expenditure in terms of nominal and real expenditure and percentage of GDP. The expenditures are then broken-down by Armed Forces branch and category of expenditure. Following that, data regarding military personnel is presented to better understand the personnel and social security expenditure. Finally, the origin of imports and the kind of defence system are presented to better understand the nature of the investments since the enactment of the National Defence Policy.

General Economy and Defence Expenditure

Brazil was the seventh largest economy in the world in 2014, but following a domestic crisis caused by political and economic factors, it fell to ninth position in 2017, staying behind only the USA, China, Japan, Germany, United Kingdom, France, India, and Italy (World Bank 2018b). The general economy indicators presented in Table 2 shows that the Brazilian GDP was around USD 2.033 trillion in 2017, representing an annual growth of only 1%, and recovering some of the loses from 2015 and 2016.

Alongside GDP, the inflation and gross capital formation are two important indicators for defence expenditure. The Brazilian government had defined inflation targets around 4.5% over

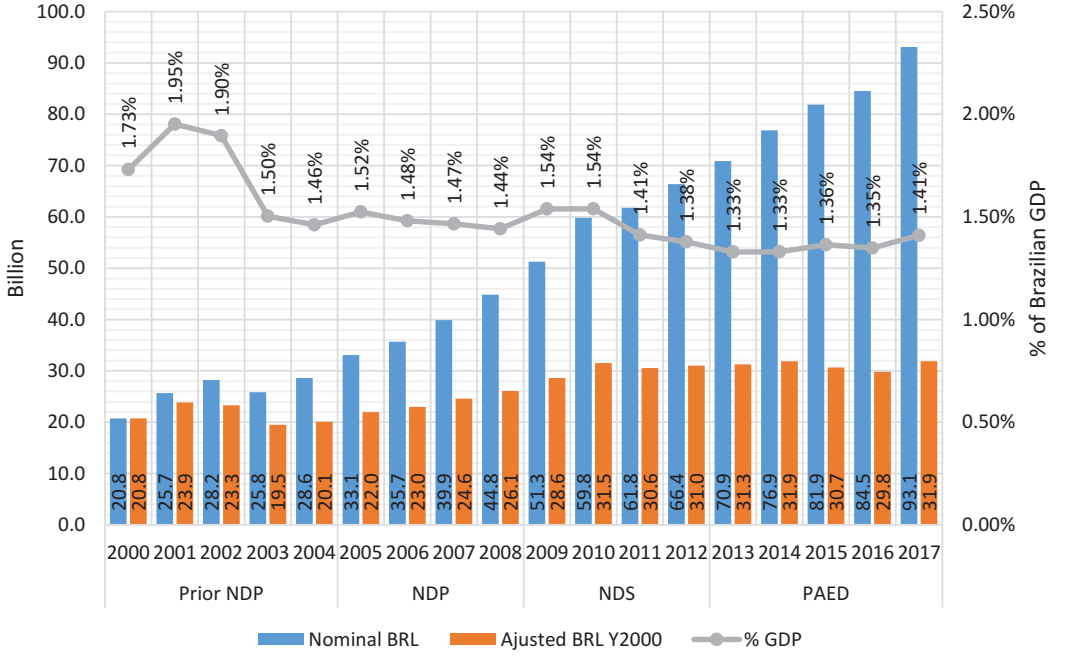
Table 2. General economy indicators.

Year	GDP (trillion)			Gross capital formation (current USD)	Inflation, GDP deflator (annual %)
	Current USD	Current BRL	Annual growth %		
2000	0.655	1.199	4.11	0.124	5.97
2001	0.559	1.316	1.39	0.105	7.67
2002	0.508	1.489	3.05	0.089	12.53
2003	0.558	1.718	1.14	0.094	9.30
2004	0.669	1.958	5.76	0.120	7.60
2005	0.892	2.171	3.20	0.153	5.69
2006	1.108	2.409	3.96	0.197	3.14
2007	1.397	2.720	6.07	0.277	4.46
2008	1.696	3.110	5.09	0.367	5.90
2009	1.667	3.333	−0.13	0.313	4.31
2010	2.209	3.886	7.53	0.482	5.91
2011	2.616	4.376	3.97	0.571	6.50
2012	2.465	4.815	1.92	0.528	5.84
2013	2.473	5.332	3.00	0.536	5.91
2014	2.456	5.779	0.50	0.505	6.41
2015	1.804	6.001	−3.77	0.318	10.67
2016	1.796	6.267	−3.59	0.277	6.29
2017	2.033	6.559	1.00	0.272	1.62

Source: (World Bank 2018b; IBGE 2018b, 2018a)

the last years, although it had failed to keep it under control (Central Bank of Brazil 2017). Moreover, the 2014 domestic crisis forced the government to reduce some important investments (gross capital formation) since the end of 2014, including some strategic defence programmes (IBGE 2018a; World Bank 2018b).

In this scenario, the defence expenditures in Brazil increased since the 2003 debates series that led to the new Brazilian defence policy framework in the following years (Graph 1). For instance, in 2003 Brazil had the eighteenth largest defence expenditure in the world while in 2017 it ended in



Graph 1. Military expenditure (Brazilian real and USD billion, and % of GDP, 2000–2017).

Source: (SIPRI 2018b)

the eleventh position in the global rank because of an increase of more than BRL 67 billion (USD 20 billion) or more than three times the previous amount invested in defence. Graph 1 demonstrates that prior to the National Defence Policy, Brazil had a stable budget of around BRL 25 billion (USD 10 billion), and already during 2003 and 2004, the years of debate and formulation of the National Defence Policy, the defence expenditure changed to an increasing trend until 2017. Real growth adjusted for inflation was 63.49% between 2003 and 2017.

Despite the nominal increase in the defence expenditure over the last few years, the defence burden (% of GDP) slightly decreased over the same period, reaching its lowest in 2016 as only 1.34% of GDP. In 2017, Brazil had the fifth lowest position among South American countries, behind Venezuela (0.48%), Argentina (0.90%), Peru (0.97%) and Paraguay (1.18%), and the second lowest among the BRICS countries (Brazil, Russia, India, China and South Africa), behind only South Africa (1.04%) (SIPRI 2018b).

Defence Budget by Expenditure Category

The defence budget presented in Graph 1 was allocated to different expenditure categories, but mainly in personnel and social security, investments and maintenance expenditures. The personnel and social security category represents the expenditures with active and retired personnel. The investment category represents the main defence programmes and minor investments acquisitions. The maintenance expenditures category represents the expenditures on goods and services that sustain the Armed Forces.

In general, as presented in Table 3, the increasing defence budget presented in the previous section had a relatively stable allocation in terms of maintenance (12.8% in 2005 and 12.7% in 2017), and personnel and social security expenditures (75.3% in 2005 and 2017). Conversely, investments expenditures increased until 2012 (5.8% to 15.1%), with a fluctuation in 2011 (10.6%), and after that declined to 7.4% in 2017. Each Armed Force branch has a similar scenario with few investment spikes when large defence programmes were added to the portfolio. For instance, in 2010 the Navy started the Nuclear Submarine Programme (PROSUB) with investments increasing from R$ 1.36 billion Brazilian Real (10.8% total Navy investment expenditure) in 2009 to R$ 3.73 billion Brazilian Real (23.3% total Navy investment expenditure). In 2012, all Armed Force branches benefited from a large vehicle acquisition made by the Federal Government (Growth Acceleration Programme – Equipment). Later that year, the Army also initiated the Integrated Border Monitoring System (SISFRON), an estimated 10 years duration and R$ 12 billion Brazilian Real investment programme. Similarly, the Air Force, among other programmes, started to invest in the National Aircraft for Transportation and Refuelling (KC-390) and the F-X2 Gripen NG aircrafts after 2015, reaching that year R$ 2.66 billion Brazilian Real (13.8% total Air Force investment expenditure) in investments (Ministério da Defesa 2018).

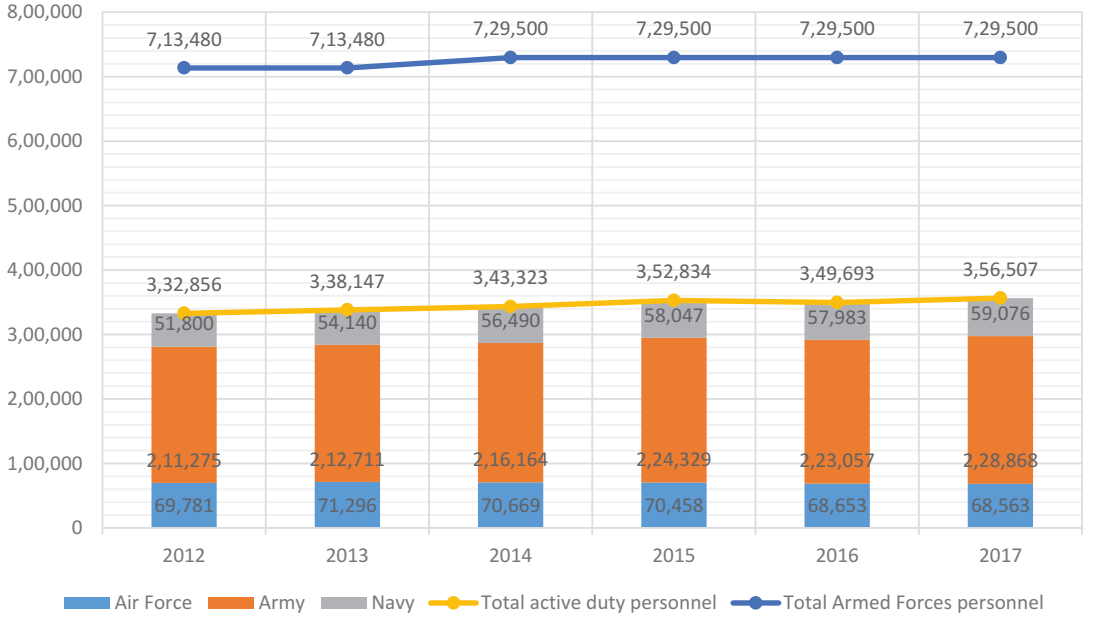
In general, the expenditure on maintenance, and personnel and social security were kept at a relatively stable level, around 12.78% and 75.46% on average, respectively. Conversely, investment expenditures slightly increased over the same period, reaching an average of 9.34% (5.8% in 2005) of the defence budget.

Military Personnel

The National Defence Strategy defined the reorganisation of the Armed Forces personnel as one of its main drivers, and focused on military conscription, rather than professional Armed Forces. A few years later, the long-term goals were set in the Brazil 2022 Plan, and, among them, a commitment to increasing military personnel by 20% (Brasil 2010; Ministério da Defesa 2012). Since then, the size of the Armed Forces (Graph 2) went from a total of 332,856 active duty military personnel in 2012 to 356,507 in 2017, an increase of 7.11%. For instance, the Army increased by 8.33%, its personnel reaching 228,868 soldiers in 2017. Similarly, the Navy increased its manpower by 14.05% since 2012, reaching 59,076 sailors in 2017. Conversely, the Air Force was the only branch that reduced its personnel, going from 69,781 airmen in 2012 to 68,563 in 2017, a decrease of 1.75% over that period.

Table 3. Defence expenditure by economic category (BRL billions) (Ministério da Defesa 2018; Ministério da Transparência 2018).

		NDP				NDS				PAED					
Expenditure Allocation		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
All Forces	**Personnel and social security**	24.86	28.52	30.73	35.33	39.40	43.65	46.45	47.27	51.26	55.59	61.57	64.36	70.74	74.96
		75.3%	80.2%	77.3%	79.2%	77.3%	73.4%	75.3%	71.2%	72.3%	72.3%	75.2%	76.2%	76.0%	75.3%
	Other current expenditures	4.21	4.20	4.74	5.53	6.28	7.30	8.09	8.21	9.38	11.20	10.68	11.45	12.02	12.63
		12.8%	11.8%	11.9%	12.4%	12.3%	12.3%	13.1%	12.4%	13.2%	14.6%	13.0%	13.5%	12.9%	12.7%
	Investments	1.92	1.76	2.67	3.41	4.80	8.24	6.53	10.03	8.96	8.26	7.24	6.95	8.52	7.35
		5.8%	4.9%	6.7%	7.6%	9.4%	13.9%	10.6%	15.1%	12.6%	10.7%	8.8%	8.2%	9.1%	7.4%
	TOTAL	**33.02**	**35.58**	**39.77**	**44.62**	**50.99**	**59.45**	**61.66**	**66.38**	**70.88**	**76.87**	**81.87**	**84.51**	**93.12**	**99.53**
		93.8%	**96.9%**	**95.9%**	**99.2%**	**99.0%**	**99.6%**	**99.0%**	**98.7%**	**98.2%**	**97.6%**	**97.1%**	**97.9%**	**98.0%**	**95.4%**
Air Force	**Personnel and social security**	5.40	6.34	6.96	8.03	8.96	9.93	10.80	10.89	11.83	12.90	14.24	14.84	16.27	17.34
		66.0%	78.7%	72.8%	75.2%	73.8%	77.1%	78.9%	74.4%	74.9%	75.9%	73.9%	77.4%	78.9%	78.9%
	Other current expenditures	0.82	0.78	1.10	1.17	1.16	1.23	1.39	1.48	1.66	1.78	1.57	1.59	1.28	1.91
		10.0%	9.6%	11.5%	10.9%	9.6%	9.6%	10.2%	10.1%	10.5%	10.5%	8.1%	8.3%	6.2%	8.7%
	Investments	0.67	0.66	0.95	1.25	1.58	1.51	1.18	1.90	1.79	1.63	2.66	2.17	2.46	1.78
		8.1%	8.2%	10.0%	11.7%	13.0%	11.7%	8.6%	13.0%	11.4%	9.6%	13.8%	11.3%	11.9%	8.1%
	TOTAL	**8.19**	**8.06**	**9.55**	**10.68**	**12.14**	**12.88**	**13.69**	**14.63**	**15.79**	**17.00**	**19.26**	**19.16**	**20.62**	**21.99**
		84.1%	**96.5%**	**94.2%**	**97.8%**	**96.5%**	**98.4%**	**97.7%**	**97.6%**	**96.8%**	**96.0%**	**95.9%**	**97.1%**	**97.0%**	**95.6%**
Army	**Personnel and social security**	12.95	14.70	15.95	18.15	20.13	22.25	23.48	23.81	25.59	27.70	30.64	32.05	35.27	37.23
		91.9%	92.3%	92.1%	91.4%	90.9%	89.1%	87.5%	82.9%	85.8%	85.8%	88.2%	87.0%	86.4%	87.3%
	Other current expenditures	0.98	1.00	1.07	1.31	1.45	1.93	2.24	2.20	2.67	3.26	3.20	3.68	4.01	4.00
		7.0%	6.3%	6.2%	6.6%	6.5%	7.7%	8.3%	7.7%	8.9%	10.1%	9.2%	10.0%	9.8%	9.4%
	Investments	0.10	0.12	0.23	0.37	0.57	0.80	1.12	2.71	1.58	1.33	0.91	1.12	1.56	1.40
		0.7%	0.8%	1.3%	1.9%	2.6%	3.2%	4.2%	9.4%	5.3%	4.1%	2.6%	3.0%	3.8%	3.3%
	TOTAL	**14.10**	**15.92**	**17.32**	**19.85**	**22.14**	**24.97**	**26.84**	**28.73**	**29.84**	**32.28**	**34.75**	**36.85**	**40.84**	**42.63**
		99.5%	**99.4%**	**99.6%**	**99.9%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Navy	**Personnel and social security**	6.26	7.14	7.74	9.01	10.15	11.25	11.93	12.31	13.51	14.51	16.14	16.85	18.56	19.70
		86.9%	90.5%	88.2%	85.8%	80.4%	70.2%	73.0%	70.5%	70.7%	71.7%	77.6%	80.0%	76.2%	72.1%
	Other current expenditures	0.78	0.49	0.66	0.94	1.05	1.00	1.35	1.33	1.31	1.80	1.65	1.63	2.02	1.83
		10.8%	6.2%	7.5%	9.0%	8.3%	6.2%	8.3%	7.6%	6.9%	8.9%	7.9%	7.7%	8.3%	6.7%
	Investments	0.04	0.20	0.34	0.54	1.36	3.73	2.78	3.32	3.51	2.87	1.73	1.52	2.58	2.21
		0.6%	2.6%	3.9%	5.1%	10.8%	23.3%	17.0%	19.0%	18.4%	14.2%	8.3%	7.2%	10.6%	8.1%
	TOTAL	**7.21**	**7.89**	**8.78**	**10.51**	**12.61**	**16.04**	**16.33**	**17.46**	**19.10**	**20.23**	**20.80**	**21.06**	**24.34**	**27.34**
		98.3%	**99.2%**	**99.6%**	**99.8%**	**99.5%**	**99.7%**	**98.3%**	**97.2%**	**96.0%**	**94.8%**	**93.8%**	**95.0%**	**95.2%**	**86.8%**



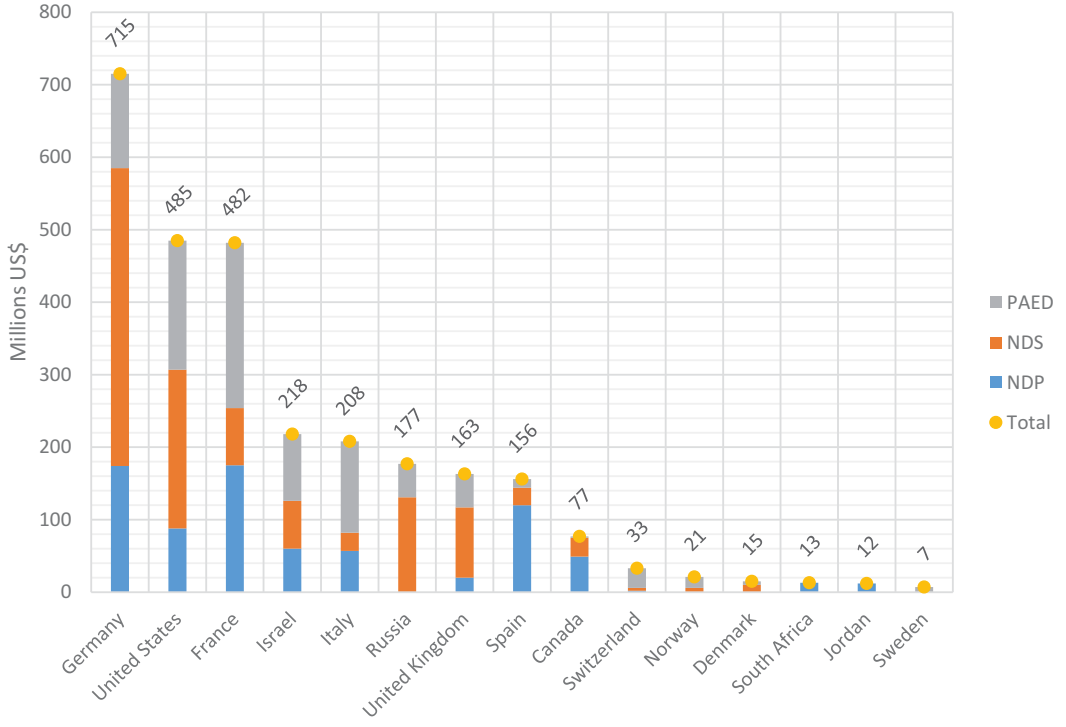
Graph 2. Active duty military personnel (2012–2017).
Source: (Ministério da Transparência 2018; World Bank 2018a)

The quantitative change observed in Graph 2 was also realised in qualitative terms. The National Defence Strategy defined that the Army should focus mainly on conscripted soldiers, while the Air Force and the Navy should focus on professional airmen and sailors, given the complexity of the defence systems involved in these branches.

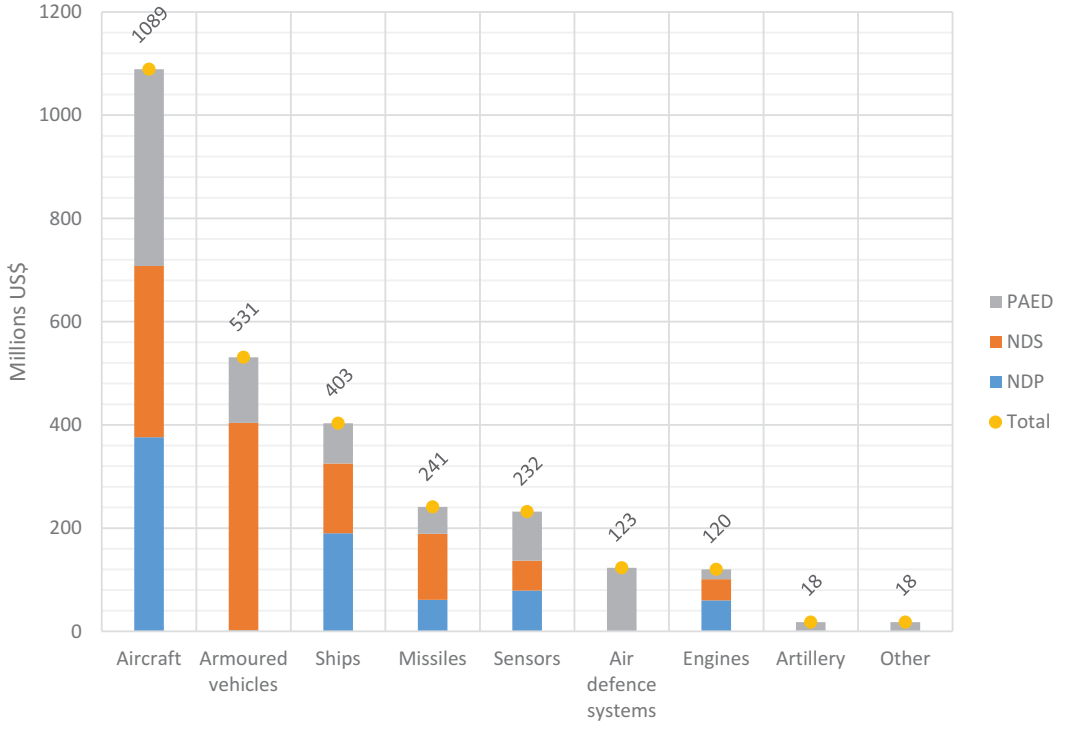
Defence Imports

Focusing on the investments, part of the expenses is consumed by the importing of weapon systems or components to develop the main defence programmes. An analysis of Graph 3 and Graph 4 helps to identify the main commercial partners and products acquired since the enactment of the Brazilian National Defence Policy. The three main countries exporting weapon systems, arms and parts to Brazil were Germany (USD 715 million), United States (USD 485 million) and France (USD 482 billion). Germany supplied submarine, armoured vehicles, engines, and air defence systems. The United States was an important supplier of aircrafts, helicopters, artillery systems, armoured vehicles, engines and sensors. France was a major supplier of ships, submarines, helicopters, aircrafts, and missiles. Countries such as Israel (USD 218 million), Italy (USD 208 million), Russia (USD 177 million), United Kingdom (USD 163 million), Spain (USD 156 million), Canada (USD 77 million), among others, also sold weapon systems to Brazil, albeit at a much lower level (SIPRI 2018a).

Conversely, analysis of the imports by weapon category (Graph 4) helps to understand what kind of weapons systems and technologies are being imported to develop the defence programmes. The main weapon imports categories were aircrafts (USD 1.089 billion), armoured vehicles (USD 531 million), ships (USD 403 million), missiles (USD 241 million) and sensors (USD 232 million). The aircraft imports were composed of systems and parts of transport aircrafts,[1] air fighters,[2] and helicopters.[3] The armoured vehicles imports were mostly related to main battle tanks,[4] personnel carrier,[5] and some amphibious vehicles.[6] The ships imports were composed of vessels,[7] submarines[8] and parts or projects to be produced in Brazil.[9] The missile category was composed of anti-ship,[10] air-to-air,[11] air-to-surface[12] and surface-to-air[13] missiles imports. The sensors imports were components of defence programmes to modernise and produce aircrafts, ships, submarines and artillery systems in Brazil (SIPRI 2018a).



Graph 3. Brazilian arms imports by country (2000–2017).
Source: (SIPRI 2018a)



Graph 4. Brazilian arms imports by weapons category (2000–2017).
Source: (SIPRI 2018a)

The weapons systems presented in Graph 4 were used as part of several defence programmes in Brazil, as illustrated in Figure 1. Based on Figure 1, it is possible to observe that few defence programmes existed prior to the National Defence Policy, with only the Brazilian Navy and the Air Force engaged in some major initiatives such the production of the Grajaú Class Patrol Vessel and the Barroso Class Corvette, the modernisation of the Niteroi Class Frigate, the Amazon Vigilance System (SIVAM) programme, and the beginning of the Super Tucano light attack aircraft

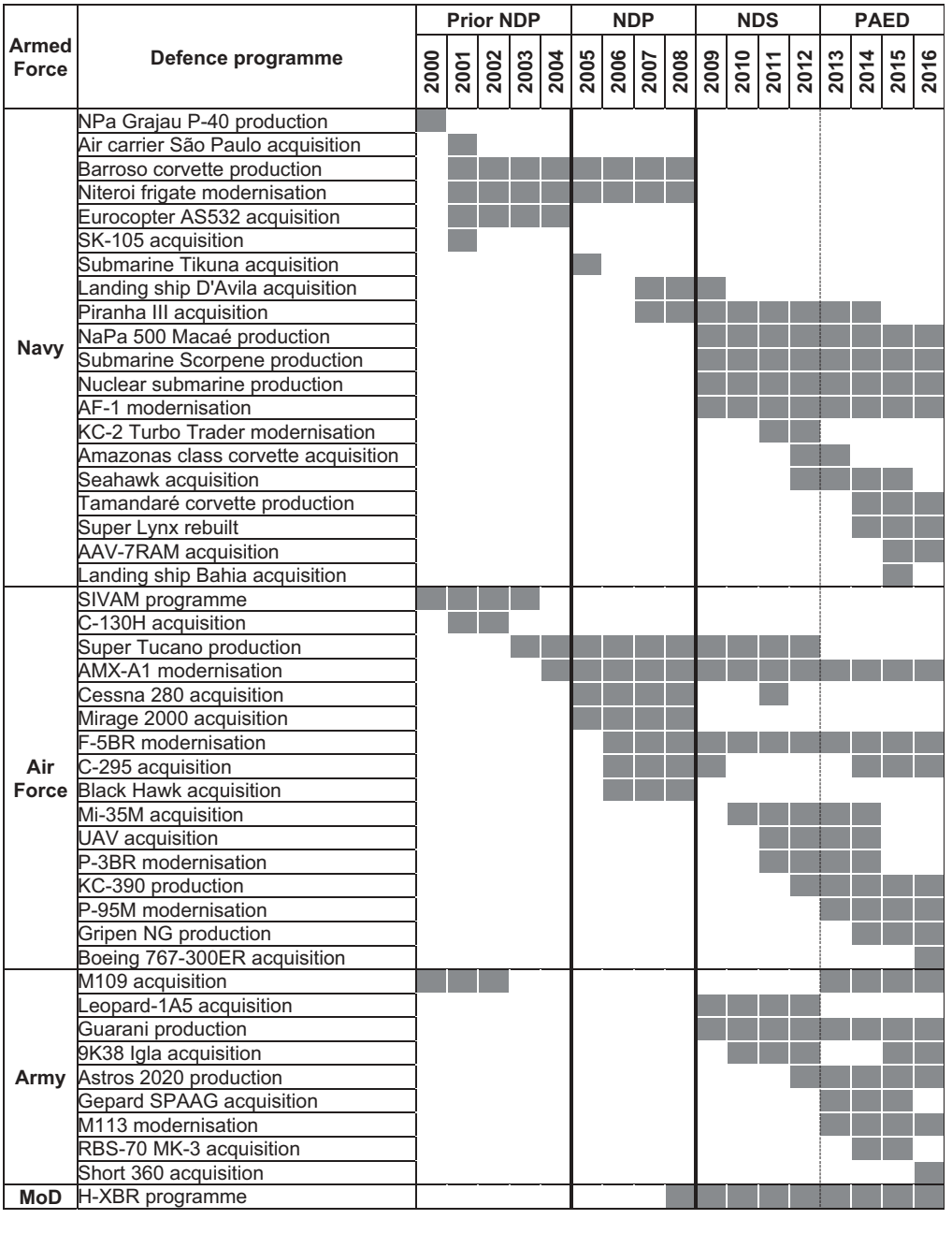


Figure 1. Brazilian arms imports by defence programmes (2000–2016).
Source: (SIPRI 2018a)

production. The few remaining imports in that period were off-the-shelf acquisitions. It was only with the enactment of the National Defence Policy that other defence programmes were initiated, albeit mostly by the Air Force and based on off-the-shelf acquisitions. The Navy and the Army began most of their defence programmes only after the enactment of the National Defence Strategy and with a renewed focus on local production, such as the case of the Macaé Class Patrol Vessels, the Scorpene Class submarines, the Nuclear submarine, the Guarani armoured vehicles, the ASTROS rocket launchers, and the H-XBR helicopters programmes. The period after the PAED was a continuation of the cycle initiated after the National Defence Strategy, given that its purpose was to consolidate the strategy rather than to change it substantially.

In summary, prior to the National Defence Policy, USD 1.174 billion were imported between 2000 and 2004, an average of USD 234.8 million per year, a great deal of it related to the air carrier São Paulo, its combined weapon systems and modernisation. Between the National Defence Policy and the National Defence Strategy, from 2005 to 2008, USD 590 million were imported, an average of USD 147.5 million per year, almost half of it imported by Air Force programmes. After the National Defence Strategy and prior to the PAED, between 2009 and 2012, USD 1.098 billion were imported by the Armed Forces, an average of USD 274.5 million per year, allocated to several defence programmes. Finally, after the PAED, USD 810 million were imported, an average of USD 202.5 million per year (SIPRI 2018a)

Discussion

At the beginning of this article, we stated that the research goals were to analyse the defence expenditure under the Brazilian Defence Policy to answer what was implemented and how it was implemented. Therefore, we divided the discussion of the data previously presented into two subsections, one for each research goal.

What Was Implemented by the National Defence Policy?

The results presented in the last section showed a real growth of 63.49% in the defence expenditure since the initial debates in 2003 regarding the National Defence Policy. Over the same period, the defence burden was on average only 1.41% of the GDP. In this scenario, we argue that there is a mismatch between the strategic goals set and the government's delivery capacity. Dagnino (2010) explained it, arguing that the increased defence budget favoured personnel and social security expenditures rather than investments and that these choices could slow down the transformation process put in motion by the National Defence Policy, especially in the case of the Army which has the largest expenditure on personnel and social security. In fact, personnel and social security expenditure increased by 46.76% since 2005 while military personnel (active duty and retired) increased by only 8.40% over the same period, which supports Dagnino's (2010) argument. This scenario raises two import characteristics regarding the implementation of the Brazilian Defence Policy. First, it demonstrates that the defence burden is low compared to the country's ambition, and higher levels of expenditure would be necessary to deliver the planned goals. Second, the Armed Forces focused on a strategy based on a large military force spread across the territory, rather than a small, flexible and mobile force capable of being present wherever and whenever necessary. These two characteristics, low defence burden compared to the country's ambition and high personnel and social security expenditure, creates some challenges for the implementation of the National Defence Policy.

The challenges to the implementation of the National Defence Policy imply a choice between two alternatives. On one hand, the Brazilian government would have to increase the defence expenditure to finance its defence programmes, which might prove a difficult negotiation as a developing country like Brazil has other more popular and also necessary investments needs, such as education, health, and infrastructure (Correa and Cagnin 2016). On the other hand, the Armed Forces would be faced with the need to rethink its allocation choices, reducing expenditure

in personnel and social security (recruitment policy) and increasing its investments (reorganisation of the Armed Forces); this might be another difficult decision as a small force might be insufficient to protect a continental size country as large as Brazil. Analysis of the defence investments showed some efforts to build an Armed Force based on modern weapon systems, although the increased investments in such systems tend to lead to increased operational and maintenance expenditures in the future; when combined with the current level of personnel and social security, expenses might be unsustainable under the current defence budget level. Therefore, it is necessary to find a balance between the National Defence Policy vision, the current budget allocation choices (recruitment and investments policies), and the actual level of the defence burden in order to build a sustainable development path.

Going back to the research goal regarding what was implemented by the Brazilian Defence Policy, we argue that the increased defence expenditure focused on developing and buying modern equipment and paying better salaries. However, the extent and pace of these changes were still below what was envisioned by the National Defence Policy. On one hand, the annual investment in the defence programmes was below the levels estimated, which caused delays in the delivery of most programmes. For instance, the Army delayed seven of its nine major defence programmes. The light armoured vehicle programme (GUARANI) deadline went from 2030 to 2040, the border surveillance programme (SISFRON) went from 2021 to 2035, the ASTROS 2020 rocket launcher programme went from 2018 to 2023, the air defence programme from 2030 to 2039, the cyber defence programme from 2015 to 2021, the PROTEGER programme from 2023 to 2037, and the full capacity programme (OCOP) from 2022 to 2035 (EPEx 2018). On the other hand, the military personnel salaries are still among the lowest among Federal Government employees, and so, even after raising salaries, professional soldiers continue to leave the Armed Forces.

As a consequence, the Brazilian Armed Forces face a quantity versus quality dilemma; so far, they have opted for quantity over quality, which has posed an additional challenge to the implementation of the National Defence Policy and we see it as a denial of the reality of their budget against their objectives. Modern weapon systems such as the ones implemented by the Brazilian Armed Forces programmes cost much more to implement and maintain than their actual systems. A general rule of thumb in system engineering is that 25% to 30% of the life-cycle cost of a system is spent until its implementation phase, remaining 70% to 75% for operation and maintenance costs. As we showed, the Brazilian Armed Forces face budget shortages to implement their programmes, and their budget for operations and maintenance (other current expenditures – Table 3), which had been increased by 48% since 2005, is totally consumed by the current capabilities' costs. Therefore, the strategy used by the Armed Forces may not sustainable and after a few years, many weapon systems delivered may be unavailable because of the lack of enough resources to fund operation and maintenance.

How Was the National Defence Policy Implemented?

The defence expenditure in the last decades was shaped by three different investments cycles, as illustrated in Figure 1. The first cycle started with the enactment of the National Defence Policy in 2005 and ends with the enactment of the National Defence Strategy in 2008. The second cycle started with the enactment of the National Defence Strategy at the end of 2008 and continued until elaboration of the PAED in 2012. The third investment cycle was a continuation of the previous cycle. Since the PAED detailed the execution of the National Defence Strategy, we discuss the second and the third period as only one major cycle of investments.

Nevertheless, few defence programmes existed before the National Defence Policy with most investment expenditure being focused on importing off-the-shelf weapon systems. However, efforts were made by the Navy and the Air Force to produce some indigenous weapon systems

during that period. Therefore, it is important to recognise that, even before the National Defence Policy, the Armed Forces were concerned with their dependence on foreign technology and it was reproduced later in the policy.

For instance, the first investment cycle, between the National Defence Policy and the National Defence Strategy (2005–2008), was characterised by some opportunity acquisition and modernisation programmes in the Navy and the Air Force. This strategy kept some defence capabilities at an appropriate level to allow more ambitious defence programmes in the next investment cycle. Therefore, the National Defence Policy did not promote immediate results in terms of reorganising the Armed Forces as it initially envisioned. However, it was a key step toward establishing an aligned vision regarding what the Armed Forces should be and what would be expected from the defence industrial base, preparing them for the next investment cycle.

The second major investment cycle began with the National Defence Strategy and continued after the PAED. It was a period when several defence programmes were initiated that focused on reorganising the Armed Forces and developing some indigenous technologies. Most defence programmes in this period focused on the weapon categories (Graph 4) with a high level of importation (aircrafts, ships, and armoured vehicles), gradually replacing it for items produced nationally, a déjà vu of the imports substitution strategy implemented from the mid-1970s (Neto and Gouvea 1991). In the aircraft category, for example, Air Force programmes such as the KC-X (transport aircraft) and F-X2 (air fighter) aimed to develop in the Brazilian defence industry the capacity of producing medium-size jet-powered military transport aircraft (KC-390) and multirole fighter aircraft (Gripen NG) in addition to the already dominated technology to produce turboprop light attack aircraft (Super Tucano). Based on that capacity, previous imports such as the Lockheed C-130 Hercules, the Northrop F-5, the Dassault-Breguet Mirage 2000 and equivalent equipment would be replaced by nationally produced weapon systems such as the Embraer KC-390 and the Saab Gripen NG, respectively. Similar substitutions occurred in other categories given that a series of defence programmes began with a clear drive of obtaining autonomy in critical technologies (Brasil 2008). Consequently, the Ministry of Defence defined that the main drivers to develop these defence capabilities were the H-XBR (helicopters), SGDC (satellite), PROSUB (submarines), PNM (Navy nuclear programme), SisGAAz (maritime boundary surveillance), SISFRON (border surveillance), Guarani (light armoured vehicle), Cyber Defence, KC-X (transport aircraft), F-X2 (air fighter) and the A-DARTER (missile) programmes (Ministério da Defesa 2015). These programmes, in addition to several other programmes defined by each Armed Force branch, created a series of minor projects that aimed to revitalise the Brazilian defence industrial base.

Returning to the research goal regarding how the National Defence Policy was implemented, we argue that it was implemented during three investment cycles that began with off-the-shelf acquisitions and moved to the execution of defence programmes that aimed to develop indigenous technologies, substituting imports on the way. However, despite the existence of well-conceived defence programmes, the total investment planned in the PAED was estimated at USD 204 billion between 2012 and 2047, an average of USD 5.8 billion per year. Although, the annual defence investment presented in Table 3 was less than half of it, and, as discussed in the last section, it might lead to delays or changes in the scope of the Armed Forces reorganisation if the defence budget remains at the same level.

Conclusion

The purpose of this article was to fill the literature gap regarding the implementation of the National Defence Policy, adding to the country survey debate from a Brazilian perspective. Therefore, this article continued our previous discussion regarding the Brazilian defence policy but now focused on two interconnected research questions. First, we examined the budget allocation choices to identify what was implemented by the Brazilian defence policy. Second, we examined the reorganisation of the Armed Forces to identify how it was implemented.

The data collected demonstrated an increased defence expenditure in Brazil after the enactment of the National Defence Policy. Most of the expenditure was focused on personnel and social security, maintenance, and investments. The Armed Forces personnel also increased in size and changed in quality during that period. Finally, the imports over the period focused on high technology weapon systems such as aircrafts, armoured vehicles, ship, missiles, and sensors. Based on that, the discussion findings were twofold. First, answering what was implemented by the policy, we found that the increased defence expenditure focused on developing and buying modern equipment and paying better salaries. However, the extent and pace of these initiatives were insufficient, resulting in investments delays and salaries still being among the lowest in the Brazilian federal government. Second, answering how the policy was implemented, we found that it was implemented during three investment cycles that began with off-the-shelf acquisitions and moved to the execution of defence programmes that aimed to develop indigenous technologies, substituting imports on the way. Again, the extent and pace of the initiatives were insufficient to deliver the benefits envisioned by the policy.

Based on these findings, we conclude that the National Defence Policy (Brasil 2005) objectives of 'developing a defence industrial base to ensure autonomy in vital technologies' and structuring the Armed Forces 'around capabilities, providing them with personnel and material in accordance with strategic and operational planning' were pursued. Similarly, the major structuring drivers defined in the National Defence Strategy (Brasil 2008), namely the reorganisation of the Armed Forces, the reorganisation of the defence industrial base; and the Armed Forces personnel policy were also pursued. However, the Armed Forces personnel policy focused on conscription had proven to be an obstacle to the achievement of the National Defence Policy and Strategy objectives. An Armed Force equipped with modern equipment requires additional and constant personnel training, which is difficult to achieve in a conscripted force with a high annual personnel turnover. Moreover, highly technological equipment tends to cost more to maintain, and so the increased maintenance expenditure, combined with the already high personnel and social security expenditure, constrain the capacity to invest in the development of these systems. Consequently, the most likely scenario is that the achievement of the vision identified in the National Defence Policy will be compromised, given that delays caused by the expenditure constraints might result in the delivery of outdated technologies and weapon systems, keeping a never-ending technological gap.

The findings and conclusions have some implications for stakeholders such as scholars, military and government officials. For instance, scholars can use the foundation developed by the country survey and build upon these findings other research topics regarding defence and peace economics in Brazil. Military and government officials, on the other hand, can use the findings and conclusions to reassess the implementation initiatives regarding the National Defence Policy, paving the way to a more sustainable National Defence Strategy.

Despite the large amount of data collected and presented, this article has some limitations. The data available regarding the defence budget by expenditure category was only available since 2005, limiting our analysis prior to the enactment of the National Defence Policy. Moreover, the Brazilian Ministry of Defence and the Armed Forces do not report their expenditures based on military functions, limiting our analysis to expenditure categories. Similarly, data regarding active duty military personnel by Armed Force branch was available only since 2012, limiting the analysis to that period forward. Also, we were unable to collect data regarding personnel composition in terms of ranks, limiting the analysis of the personnel policy to qualitative (size) rather than qualitative (composition) focus. Finally, few data regarding investments in defence programmes through Brazilian companies were available, limiting the analysis to import expenditure. We suggest further research be carried out on the Brazilian defence policy topic to address the limitations of this article, while also researching other aspects such as economic and military power impacts on the policy, project complexities executing the defence programmes, and capacity to deliver the defence programmes.

Notes

1. Cessna 208, Lockheed P-3 Orion, Grumman C-1 Trader, Boeing-767-300ER, Shorts-360 and Airbus CASA C-295.
2. Mirage 2000, F-5BR, A-4K Skyhawk and AMX-A1.
3. Sikorsky UH-60 Black Hawk and SH-60 Seahawk, AH-11A Super Lynx, Mi-35M, Eurocopter EC725.
4. Leopard-1A5.
5. M113.
6. SK-105 Kürassier, MOWAG Piranha III and AAV-P7/A1 assault amphibious vehicles.
7. VT-90M offshore patrol vessel, landing ships D'Avila and Bahia.
8. Tikuna class submarine.
9. Patrol vessel Grajaú P-40, Barroso corvette, Niteroi frigate, patrol vessel P-400, Tamandaré corvette, Scorpene and nuclear submarine.
10. AM-39 Exocet, Pinguin-2 anti-ship missile.
11. Python-4 BVRAAM, Derby BVRAAM.
12. Lizard guided bomb.
13. Igla S/SA-24 Portable SAM.

Disclosure statement

No potential conflict of interest was reported by the authors.

References

Beeres, R., E. J. D. Bakker, M. Bollen, and E. Westerink. 2012. "Country Survey: An Economic Analysis Of Military Expenditures In The Netherlands, 1990–2009." *Defence and Peace Economics* 23 (4): 365–387. doi:10.1080/10242694.2011.607283.

Bildirici, M. E. 2017. "Militarization, Economic Growth and Petroleum Consumption in Brazil, Russia, India, China, Turkey, South Africa and Mexico." *Economic Computation and Economic Cybernetics Studies and Research* 51 (2): 249–266.

Brasil. 2005. "*Decreto N° 5.484, de 30 de Junho de 2005 [Decree No. 5,484, 30th June 2005]*." Brasília. https://goo.gl/MsYPhV

Brasil. 2008. "*Decreto N° 6.703, De 18 De Dezembro De 2008 [Decree No. 6,703, 18th December 2008]*." Brasília. https://goo.gl/cBY8XG

Brasil. 2010. "*Brasil 2022 [Brazil 2022]*." Brasília. https://goo.gl/F3EehA

Carlos, A. L., and R. M. D. Oliveira Leite. 2013. "Struggling for Survival and Success: Can Brazil' Defense Industry Help Foster Innovation?" In Carolina Machado and J. Paulo Davim (Eds). *Management and Engineering Innovation*, 127–154. Hoboken, NJ: John Wiley & Sons, . doi:10.1002/9781118733202.ch5.

Caruso, R., and A. Francesco. 2012. "Country Survey: Military Expenditure And Its Impact On Productivity In Italy, 1988–2008." *Defence and Peace Economics* 23 (5): 471–484. doi:10.1080/10242694.2011.608964.

Central Bank of Brazil. 2017. "Inflation Targeting in Brazil." Brasília. http://www.bcb.gov.br/pec/metas/InflationTargetingTable.pdf

Correa, C. R., and C. H. Cagnin. 2016. "Prospective Games for Defence Strategic Decisions in Brazil." Edited by Effie Amanatidou." *Foresight* 18 (1): 4–23. doi:10.1108/FS-07-2014-0047.

Dagnino, R. 2009. "A Política De Defesa Brasileira: Nem Racionalismo, Nem Incrementalismo [The Brazilian Defense Policy: Neither Rationalism nor Incrementalism]." *Revista Brasileira de Ciências Sociais* 24 (70): 61–74. doi:10.1590/S0102-69092009000200004.

Dagnino, R. 2010. *A Indústria de Defesa No Governo Lula*. São Paulo: Expressão Popular.

EPEx. 2018. "Portfólio Estratégico Do Exército: Atualidade E Perspectiva Para a BID [Army's Strategic Portfolio: Updates and Perspectives for the DIB]." Brasília. http://www.epex.eb.mil.br/images/pdf/EPEX_-Palestra_Pt2.pdf

Gouvea, R. 2015. "Brazil's New Defense Paradigm." *Defense & Security Analysis* 31 (2): 137–151. doi:10.1080/14751798.2015.1038452.

Hartley, K., and P. MacDonald. 2010. "Country Survey Xxi: The United Kingdom." *Defence and Peace Economics* 21 (1): 43–63. doi:10.1080/10242690903105323.

IBGE. 2018a. "System of National Accounts." Brasília. https://goo.gl/xuC7fS

IBGE. 2018b. "Time Series of the Cumulative Indexes in the Year - IPCA." Brasília. https://goo.gl/ykTeft

Johnson, A. U., K. Hove, and T. Lillekvelland. 2017. "Country Survey: Military Expenditure and Defence Policy in Norway 1970–2013." *Defence and Peace Economics* 28 (6): 669–685. doi:10.1080/10242694.2015.1101896.

Kapstein, E. B. 1990. "The Brazilian Defense Industry and the International System." *Political Science Quarterly* 105 (4): 579. doi:10.2307/2150936.

Kollias, C. 1995. "Country Survey VII: Military Spending in Greece." *Defence and Peace Economics* 6 (4): 305–319. doi:10.1080/10430719508404834.
Ministério da Defesa. 2012. "*Defense White Paper*." Brasília. https://goo.gl/8vVjoD doi: 10.1094/PDIS-11-11-0999-PDN.
Ministério da Defesa. 2015. *Ministry of Defence: Strategic Projects*. Brasília.
Ministério da Defesa. 2018. "Execução Orçamentária Dos Orçamentos Fiscal e Da Seguridade Social Do Ministério Da Defesa [Budgetary Execution of the Fiscal and Social Security Budgets of the Ministry of Defence]." Brasília. https://goo.gl/6fpdGn
Ministério da Transparência. 2018. "Servidores Civis e Militares Do Executivo Federal." http://www.portaldatransparencia.gov.br/downloads/servidores.asp#getM
Molas-Gallart, J. 1997. "Country Survey IX: Spain." *Defence and Peace Economics* 8 (3): 267–306. doi:10.1080/10430719708404882.
Neto, R., and D. Gouvea. 1991. "How Brazil Competes in the Global Defense Industry." *Latin American Research Review* 26 (3): 83–107. http://www.jstor.org/stable/2503665
Perruci, G. 1995. "The North-South Security Dialogue in Brazil's Technology Policy." *Armed Forces & Society* 21 (3): 371–394. doi:10.1177/0095327X9502100304.
Santos, P. R. D., R. S. Gutierrez Curo, and M. C. Neyra Belderrain. 2011. "Cognitve Mapping Applied to Brazilian Aerospace Decision Problem." *Journal of Aerospace Technology and Management* 3 (2): 215–226. doi:10.5028/jatm.2011.03021211.
Sezgin, S. 1997. "Country Survey X: Defence Spending in Turkey." *Defence and Peace Economics* 8 (4): 381–409. doi:10.1080/10430719708404887.
Silva, L., and A. Henrique. 2010. "Globalização Militar, Segurança e Desenvolvimento: Comparação Entre as Indústrias Aeroespaciais de Defesa de Brasil, Índia e China [Military Globalisation, Security and Development: Comparison of Aerospace Defence Industries of Brazil, India and China]." *Papel Politico* 15: 667–690.
SIPRI. 2018a. "SIPRI Arms Transfers Database." https://goo.gl/tJfqtk
SIPRI. 2018b. "SIPRI Military Expenditure Database." https://goo.gl/UVuVo2
Struys, W. 2002. "Country Survey XV: Defence Policy and Spending in Belgium." *Defence and Peace Economics* 13 (1): 31–53. doi:10.1080/10242690210962.
Suarez, M., R. D. Villa, and B. Weiffen. 2017. *Power Dynamics and Regional Security in Latin America*, edited by A. G. Marcial, R. Suarez, D. Villa, and B. Weiffen. London: Palgrave Macmillan UK. doi: 10.1057/978-1-137-57382-7.
World Bank. 2018a. "Armed Forces Personnel, Total." https://goo.gl/f1ahJN
World Bank. 2018b. "World Bank Database." https://goo.gl/jchxes