

MADE IN PORTUGAL: THE PORTUGUESE DEFENCE INDUSTRY DURING THE COLONIAL WAR (1961-1974)

MADE IN PORTUGAL: A INDÚSTRIA DE DEFESA NACIONAL DURANTE A GUERRA COLONIAL (1961-1974)

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Abstract

Defence industries have a strategic role in the state's national defence. They are composed of diverse sectors, with productive and technological levels varying in terms of dimension and scale. Following Abel Cabral Couto's notion of genetic strategy and strengthening of strategic potential, this study explores the case of Portuguese defence industries during the colonial war period (1961-1974) and examines their strategic role through three case studies: the Fabrica Militar de Braço de Prata; Metalúrgica Duarte Ferreira; and Bravia, S.A.R.L. It shows the significance of industrial activity for the war effort in Portugal, a country lacking great economic and military capability, particularly in the areas of industrial capacity-building and asset conversion to military purposes.

Keywords: Weapons, Portugal, Defence Industries, Strategy, Colonial War.

Resumo

As indústrias de defesa têm um papel estratégico pois fornecem os meios que os Estados usam na defesa nacional. Estas estruturas apresentam-se diversas no seu setor de atividade, assim como na dimensão e escala do seu nível produtivo e tecnológico. No que diz respeito à Estratégia, entendida à luz do pensamento de Abel Cabral Couto, as indústrias de defesa constituem ativos enquadrados na lógica da estratégia genética e do fortalecimento de potencial estratégico. O presente ensaio aborda o caso das indústrias de defesa portuguesas durante a guerra colonial (1961-1974) e examina o seu papel estratégico através de três casos de estudo. Não sendo Portugal um país de grandes capacidades económicas ou militares, verifica-se que a atividade industrial empreendida durante esse período foi essencial para o esforço de guerra então conduzido, representando um notável exemplo de conversão e capacitação industrial.

Palavras-chave: Armamento, Portugal, Indústrias de Defesa, Estratégia, Guerra Colonial.

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1. Introduction

Between 1961 and 1974, Portugal was engaged in a difficult military campaign in the African territories under Portuguese control, where it had to fight on three fronts against five liberation movements and their respective armed groups. The conflict was the result of an independence wave that many other colonial powers had attempted to counter in the 1950s and 1960s (Telo, 1994, pp.349-351), generally unsuccessfully. The Portuguese political and military decision makers fought this wave with determination at a time when Portugal was neither rich, developed, or had advanced military capabilities (Cann, 1998, p.19). This paper begins by establishing the links between Strategy, military technology and defence industry to analyse the Portuguese military industrial production during the colonial war. The study describes how this industry evolved and provides some examples of its strategic importance as described by Abel Cabral Couto.

When Portugal chose the military option, it embarked on an ambitious task of conducting three counterinsurgency¹ campaigns in Angola, Guinea and Mozambique, several thousands of kilometres away from mainland Portugal, setting in motion a strategy that required considerable resources (Cann, 1998, pp. 19-25). The first step was to mobilise massive numbers of troops and procure large quantities of light weapons, ammunition, vehicles and other capabilities. This was an unlikely undertaking for a country that, despite holding a colonial empire, could not project a significant amount of power. Thus, it largely relied on the national military factories, which played a crucial role in sustaining the war effort by producing weapons and war materials that were costly and difficult to obtain. Although this productive structure was initially modest and did not meet the military and technical standards of the time, the Portuguese State mobilised the technological skills and capabilities of several public and private factories to produce military equipment.

The Portuguese military industry during the colonial war is a relevant topic for the study of Security and Defence, and especially to analyse the interaction between Strategy² and military technology, not only because of its historical importance but also for its conceptual and technical peculiarities. Defence industries generally have strategic importance to States because their structures provide the means ? that is, the weapons and weapons systems ? by which States exercise their sovereignty. These industries are invaluable because they generate the capabilities and potential that Strategy relies on to achieve its goals. Their profile also varies considerably in terms of production sector, technological level, size or type of link to the military and the State. The national industrial landscape rose to the occasion during the colonial war, and there were remarkable examples of manufacture and design of various war materials in terms of both quality, quantity and costs. Without this combination of factors, it would have been difficult for the Portuguese Armed Forces and the Portuguese State to sustain the war effort for more than ten years.

The study is delimited in terms of time and content to: the period of the colonial war (1961-

¹ In Portuguese strategic thinking, the term “counter-subversion” is frequently used to refer to counterinsurgency. The author opted to use “counterinsurgency” for translation purposes in order to maintain congruence with the international literature.

² “Strategy” is capitalised in this study when it refers to the discipline, to differentiate it from how the concept is referred to in common usage.

1974) and; the Portuguese military factories and Strategy as a discipline of military science. It argues that the Portuguese case was an important example of how to increase potential by activating and training technical and industrial capabilities that have a strategic dimension. Furthermore, the study will attempt to show that this industrial base, which consisted of a set of factories with different profiles and purposes, played a decisive role in sustaining the war effort, and, thus, in the counterinsurgency strategy deployed in Africa (Tavares, 2005, p.21).

2. Methodology and method

There are few studies on this often forgotten topic, and analysing it today is no easy task. Most of the factories have either been deactivated or dismantled, and not many comprehensive and systematic studies have explored their archives. This study will analyse the topic using a qualitative research strategy based on data collected from open sources and on Abel Cabral Couto's Strategy concepts. This approach provides a heuristic framework for interpreting the relationship between Strategy and the national military industry during wartime, according to a narrative that is essentially conceptual and historical. The analysis was based on a literature review of reference works on the colonial war and on information on the Portuguese defence factories collected from monographs, scientific journals and other unofficial sources such as expert journals, blogs and enthusiasts' associations.

The paper is divided into four phases: the first addresses the main theoretical aspects of Strategy that have an impact on the defence industry, specifically, genetic strategy and strategic potential. The second describes the key features of each defence factory to establish their nature, level of self-sufficiency and processes. The third reviews the historical and military context at the onset of the colonial war, when there was an urgent need to obtain weapons and war materials by mobilising the national industries. The fourth consists of an analysis of three case studies, and identifies the strategic role of the defence factories in sustaining the war effort. The final section provides a reflection on the case studies through the lens of Cabral Couto's thinking on Strategy and the corresponding concepts used by the defence industry to demonstrate the strategic importance of the national defence factories in sustaining the war effort.

3. Theoretical framework

The conceptual framework through which the topic will be analysed involves three theoretical domains that relate to defence industries and their strategic importance. The first two are key concepts for the thinking of Abel Cabral Couto: genetic strategy and strategic potential. The third refers to the concepts used by the defence industry, which generally have their origin in the field of defence economics. Describing these concepts will provide the tools to analyse the case studies and interpret them through the lens of Strategy.

3.1. Genetic strategy

The decision of the Portuguese political and military authorities to conduct a counterinsurgency war in Africa meant that the Armed Forces had a strategic mission

to accomplish. However, an essential condition to execute a strategic mission is having the means to do so. Generally, in all strategies there is a “divide between conception and implementation, that is, between what is desirable and what the technical conditions and material resources allow”. Thus, there is a distinction between “operational aspects (linked to the use of capabilities), genetic aspects (which refer to generating and creating new capabilities) and structural aspects (which refer to what those capabilities involve, how they are organized and coordinated)” (Couto, 1998, p.230). Therefore, while operational strategy is implemented through operational plans, genetic and structural strategies deal with force planning and programming (Couto, 1998, p.230). For this analysis, the most relevant of these categories is genetic strategy and how it affects structural and operational aspects.

As the name suggests, structural strategy involves detecting and analysing weaknesses and strengths in existing structures and finding ways to improve them and optimise their performance. State resources, and armies in particular, are not always suited to the mission entrusted to them. When this happens, their structure and organization are changed, usually after evaluating available resources in order to eliminate, correct, develop or create new ones, as well as to improve the efficiency and use of existing ones. On the other hand, genetic strategy refers to designing, building or obtaining new capabilities to implement the operational strategy. This process operationalizes the strategic concept adopted by the decision makers and enables the delivery of these capabilities in a timely manner and according to how the situation is expected to evolve (Couto, 1998, pp.230-231).

Therefore, the programmes to acquire the capabilities outlined in the genetic strategy must be planned well in advance and according to future events that may or may not occur. Any decisions on genetic strategy must always be carefully weighed because they will affect how the capabilities required by the operational component are allocated, and because they imply committing material, human and technical resources over usually long periods of time, thus it is desirable that those decisions are both prudent and correct (Couto, 1998, pp.231-232). This is one of the reasons why prospective planning plays such an important role: it provides a scientific and rational basis for the genetic strategy. Essentially, it answers the following fundamental question: “considering how the situation is expected to evolve, what capabilities and instruments should be available?” (Couto, 1998, p.232)

The answer to this question rests on the relationship between the genetic strategy and the organizations that provide the required capabilities, in this case, the defence industries. In its fullest and purest sense (that of designing, generating and producing a capability from scratch) only great powers can have a true genetic strategy. Small nations, on the other hand, usually formulate their strategy “according to the available resources” and to those that “may be obtained”, and make up for any shortcomings as their modest means allow (Couto, 1998, p.232). In the case of the colonial war, Portugal had no choice but to counter this trend as its small size allowed by attempting to create new capabilities and by refusing to let the means limit the ends. The paper argues that this process was the result of a genetic strategy, thus providing a theoretical framework through which to analyse the Portuguese military industry.

3.2. Strategic Potential

The second dimension of Strategy that influences the defence industry is the concept of strategic potential. A State's decision to adopt a given strategic doctrine and posture depends on the resources that can be allocated to it (Couto, 1998, pp.332-334). Those resources, which are "called war potential or strategic potential, can be defined as any type of forces, both moral and material, that a State can use to operationalize its strategy" (Couto, 1998, pp.241-242).

These forces can be classified and categorised according to their nature and status. With regards to nature, forces can be material (tangible) or moral (intangible). As the aim of this paper is to analyse defence industries, its focus will be material forces, which are tangible and can be expressed in concrete values such as quantities of weapons, organized military personnel, human, economic and financial resources, etc. This includes "material resources which may be provided by other States with common interests" (Couto, 1998, p.241). As for their status, forces can be readily available or latent. Readily available forces ones include "available military and militarized forces, ammunition depots, built or installed communications systems, financial resources or credits in hand". Latent forces, on the other hand, are "forces that cannot be used immediately, but that can be available within a relatively variable time frame" (Couto, 1998, p.242).

These two categories include resources that only require activation to become available (e.g. military forces on reserve or leave, resources that require legislation before they can be mobilised, etc.), resources available after conversion (including factories that can be adapted to produce or repair war materials, untrained personnel that can be employed in military or industrial activities, means of transport that can be adapted for military use, etc.), and, finally, resources that will be available after development or exploitation (such as natural resources that have been prospected but not yet exploited, industrial facilities that can be optimised to operate at higher productivity levels, etc.) (Couto, 1998, pp.243-243). When applied to the topic under study, these concepts can be used to categorise the capabilities that were available in Portugal between 1961 and 1974, as well as the processes that were developed to mobilise them for the war effort.

3.3. Defence Industries

While there is no formal definition of defence industries, the term links the concept of industry to a role of providing defence capabilities that will, in principle, be used by States. Generally, the term defence industries refers to an industrial structure directly or indirectly involved in the production of the State's defence capabilities (Dunne, 1995, p.402)³. Thus, defence industries play a key role in the national defence of any State.

While this definition encompasses a wide range of industrial sectors, the most relevant to the State's defence capabilities, as well as to the topic of this study, is the military weapons and technology sector, which involves the research, development, production and maintenance of military equipment. It may also include business organizations that provide products or

³ A term for this fabric which is widely used in the US is defence industrial base, which describes the entire industrial platform that provides the country's defence capabilities.

services to a military government agency, or a weapons manufacturer that produces weapons, ammunition, missiles, military aircraft, etc., and any related consumables and systems.

Defence industries are generally classified according to their sector of activity, that is, according to the type of weapons or defence components they produce. There are four major sectors of activity: small arms and light weapons; conventional heavy weapons; chemical and biological weapons; and, finally, nuclear weapons (Rolo, 2006, p.97).

As the last two categories are a feature of great military powers and are not available to small nations due to their huge technological and economic costs, this study will only address the range of capabilities that, on the one hand, was within Portugal's possibilities, and on the other, was used during the period of the colonial war. This includes small arms and light weapons, as well as some heavy weapons. The first category does not have a fixed definition but includes portable weapons that can be carried and operated by a single person, such as pistols, machine guns, assault rifles, heavy machine guns, as well as other heavier support weapons (European Commission, 2016; UNODC, 2014, pp.2-3); conventional heavy weapons include all conventional military equipment that is both large and complex, such as aircraft and aviation systems, transport and combat vehicles or naval capabilities (Rolo, 2006, p.97).

Weapons technologies have an entry cost, which is usually referred to as Research & Development (R&D) cost. These expenses act as a friction force and usually involve large sums. On the other hand, R&D has a learning curve that decreases costs over time and can act as a centre of gravity for related technologies (spin-in) or, in the opposite direction, to disseminate information on developed technologies (spin-off) (Dunne, 1995, p.423; Hartley, no date, pp.3-6; Molas-Gallart, 1997, pp.380-382; Sempere, 2018). In both cases, there is a cross-sectorial industrial and technological dynamic that may even enable dual-use capabilities, that is, technologies that have both civilian and military uses (Forge, 2010; Molas-Gallart, 1997; Rolo, 2006, p.202). If a State does not possess a given technology or industrial capability, it can try to obtain it through technology transfer processes – including diplomacy, espionage, trade-offs and licence acquisition, among others –, taking a shortcut to the traditional R&D process. This is, in fact, rather common since production units and technology hubs are often located in different countries (Brauer, 2007, p.985; Kozyulin, 2011, pp.5-16; Love & Roper, 1999; Macdonald, 1993).

With regards to size and sophistication, defence industries can be classified according to three levels of complexity. The most sophisticated level involves the main contractors: “companies that are market leaders and that have, directly or indirectly, complete control over their products’ value chains, from research, conception and design to development, production and marketing”. The intermediate level consists of subcontractors: “companies that may or may not be associated with the main contractors, which participate only in intermediate phases and are often isolated from the original value chains, which include licenced products, technical assistance services, upgrading and maintaining equipment and end products”; and finally, small adjacent companies that are typically scattered, which produce parts, “components and other items of low technical intensity” that are nevertheless “vital to obtain the end product” (Rolo, 2006, p.201).

Governments can use their political and financial power to manipulate the dialectic

relationship between the genetic requirements of the State's strategy and the characteristics of a specific industrial base. That is, in theory, political decision makers can intervene in the military industrial structure to control prices, set efficiency and profitability levels, and even impose full administrative control. Policies can be used to apply subsidies, manage production and export licences, establish trade-offs that prioritise government interests, and support defence industries through the acquisition of certain products (Hartley, no date, pp.2-3).

According to this theoretical framework, at the time of the colonial war there were no main contractors in Portugal. However, as this paper will establish, there was a platform of what can be called "public and private subcontractors that had some international connections" (Rolo, 2006, p.201) and who proved to have substantial, and sometimes indispensable importance. Indeed, "some of these companies were created as defence industries and later expanded their activities to the civilian sector. Others were civilian companies with expertise in areas that could be integrated into the military equipment production chains" (Rolo, 2006, p.201).

4. The Portuguese military industry during the colonial war

When war broke out in Angola in the early 1960s, the forces on the ground were still largely armed with obsolete World War II equipment, including the metal helmets, Mauser 98K repeating rifles, and Dreyse and Breda machine guns. At a time when modern armies were making technological advances in a number of fields, this equipment was unsuitable to new counterinsurgency missions (Afonso & Gomes, 2010, p.127; Pinto, 2009, pp.1593-1595). In fact, the first troops conducting operations in Africa lacked an automatic infantry weapon (the most commonly used weapon in a counterinsurgency campaign), which contrasted with the relative speed with which the liberation movements of the three fronts had access to modern weapons of that type. The remaining heavy equipment, from transport vehicles to combat aircraft, was not always current or sufficient and was generally entrusted to Portugal under NATO supply programmes, and as such, its use was restricted to an operational area that did not include the African territories (Tavares, 2005, pp.55-56).

The onset of the colonial war and its specific requirements meant that it was urgent to procure various war equipment both through international purchases from foreign contractors, and, when possible, from domestic manufacturers. Neither was easily done: in the first case, Portugal's economic constraints limited the acquisition of sophisticated material, and the regime's colonial policy resulted in a "more or less declared" embargo "on the sale of war materials [...] to Portugal, which led to the nation's political and diplomatic isolation"; in the second case, Portugal's limited technical and industrial potential meant it was "almost impossible to begin producing new products with both quantity, quality and guaranteed economic viability" without foreign support (Tavares, 2005, p.57). The situation worsened as war broke out in three separate theatres of operations and the fighting intensified (Tavares, 2005, pp.55-58).

The Portuguese decision makers tackled and solved these problems by finding contractors that could meet all the following conditions: 1) supplying the military equipment the Portuguese Armed Forces required for their operations; 2) meeting the financial requirements and preventing excess costs, and, finally; 3) "reducing Portugal's dependence

on foreign industries and producing what is needed domestically” (Tavares, 2005, pp.55-58).

At the turn of the 1960s, Portugal was “engaged in a process of modernisation and technical enhancement of its military industry, namely factories that manufactured and repaired weapons and ammunition” (Tavares, 2005, p.55). In the 1950s, these factories received considerable financial and technological aid through the Marshall Plan and as a result of Portugal’s accession to NATO. When Portugal joined NATO, the Portuguese military landscape benefitted from a climate of technological innovation (Tavares, 2005, p. 41) that made it possible to “reorganize the national defence industry” (Telo, 1995, p.960). Specifically, this aid consisted in the use of new techniques, training and technologies, but also involved the reorganization of the Portuguese military factories and the placement of several orders (Pinto, 2009, pp.1591-1592; Tavares, 2005, pp.37-43; Telo, 1995, p.960). The aid obtained through the Marshall Plan for the economic reconstruction of Europe consisted of economic and financial support to modernise and refurbish the production lines of state-run military factories (P. da S. Monteiro, 2013, pp.730-731). The experience gained from these processes improved the factories’ productive and technological capacity and built a defence industrial base that was used throughout the colonial war.

Indeed, from the 1960s onwards, the country’s strategy to obtain capabilities became clear. Lisbon’s overseas policy had put Portugal in an uncomfortable position in the international stage. This led not only to the increasing diplomatic isolation of Salazar and Caetano’s regime but also to difficulties in importing war equipment that could be used in Africa (P. da S. Monteiro, 2013, p.727). As a result, the focus gradually shifted to contractors that relied on Portuguese design and manufacturing, in order to reduce the dependence on foreign contractors and provide alternatives to importing equipment. One of the most relevant was the exploitation of trade-offs obtained through trade and diplomatic relations with foreign countries, in particular with the Federal Republic of Germany (FRG) (Fonseca, 2007). In fact, for several years Portugal maintained a fruitful and dynamic relationship with the FRG, through which it was able to obtain technical improvements and skills that enabled it to “take a shortcut” and increase the country’s war potential and industrial potential, something that should have been incredibly difficult to achieve, considering that the weapons markets were relatively off-limits to Portugal (Fonseca, 2006, pp.50-55).

The next section will describe three case studies that were paradigmatic examples of the thesis advanced in this paper, that is, that Portuguese military industries played a strategic role in the colonial war. As the term *defence industries* can refer to a wide range of sectors, it will be used in this paper to refer to the military equipment manufactured in Portugal during the colonial war, that is, light weapons, ammunition and military vehicles. The first case study analyses the *Fábrica Militar de Braço de Prata* (FMBP) [Braço de Prata Military Factory], a state-owned factory that produced ammunition and light weapons; the other two address *Bravia (Sociedade Luso-brasileira de Veículos e Equipamentos S.A.R.L.)* [Bravia (Luso-Brazilian Society of Vehicles and Equipments S.A.R.L.)] and *Metalúrgica Duarte Ferreira SARL (MDF)* [Duarte Ferreira Metal Works SARL], two private companies that built the armoured and transport vehicles that were crucial in the African theatres of operations.

4.1. *Fábrica Militar de Braço de Prata*

The first case study examines the *Fábrica Militar de Braço de Prata* (FMBP), a factory located in the eastern part of Lisbon which exclusively produced light weapons, ammunition of various calibres, and several other items. The factory began its activity in the early 20th century and was extensively restructured and refurbished during the 1950s, when large sums were invested in industrialising its production lines, training technical staff and acquiring machinery through the Marshall Plan and through the NATO programmes that had become available when Portugal became a member (Tavares, 2005, pp.38-45). Through its accession to the Atlantic alliance, a political and military organization, Portugal was able to completely renew the FMBP and use it to fill large orders, including an order of 350,000 10.5 cm artillery shells from the US government in 1953 (Tavares, 2005, p.42; Telo, 1995, p.760). On the other hand, the Marshall Plan focused on the economic reconstruction of the European territory, and the aid granted to the FMBP consisted of subsidies for refurbishing and modernisation, which were used to build “two production lines in the Ammunition Section, one for artillery and the other for mortars” (Pinto, 2009, pp.1591-1592). The aid received under the Marshall Plan in 1952 covered about 45% of the total investment in that factory (Tavares, 2005, p.38). In a further boost to this modernisation drive, the US and the Federal Republic of Germany placed several orders for ammunitions that revitalised the spirit of innovation and growth in the Portuguese military industrial fabric (P. da S. Monteiro, 2013, pp.730-731; Tavares, 2005, pp.43-53).

Decree-Law 41892 of 03 October describes the FMBP’s organizational mission as defined by the Ministry of the Army in late 1958:

[...] the manufacture and repair of all types of weapons; the manufacture and repair of metal components or subcomponents of ammunition for weapons with calibres of 40 mm or greater; the manufacture and repair of precision instruments, electrical equipment and referencing or trajectory prediction equipment; the manufacture and repair of animal traction vehicles; manufacture and repair of specialised artillery vehicles, ammunition and armoured vehicles (including weapons and equipment, but excluding engines); and the manufacture of tools required for the operation of military industries.⁴

This kick-started a period of intense manufacturing activity that would gradually increase over the following years due to the colonial war and the resulting need to equip and arm the Armed Forces by producing modern light weapons, the most famous of which was the Heckler & Koch G-3. The research for this weapon, which began as early as in 1960, was enabled by the good relations between Portugal and the FRG, and in mid-1962 Portugal began producing parts for the G-3 such as barrels and ammunition clips (Tavares, 2005, pp.64, 161). That same year, the German government placed an order for 50,000 units of this weapon and provided the FMBP with the technical equipment and know-how required to produce it, as well as the respective licences. With this last step, in 1962 the factory had everything it needed to produce all parts of the model, thus becoming self-sufficient in the production of this important combat tool. Over the following years, the FMBP gradually

⁴ Decree-Law No. 41892 of 3 October, Ministry of the Army. Diary of the Government: 1st Series, No. 214 (1958).

began producing more components for the G-3, and by late 1967 approximately 84% of the weapon's components were produced domestically (Tavares, 2005, p. 64). From 1962 to 1974, about 300,000 weapons were delivered to the Armed Forces (Tavares, 2005, p.206), and the production rate at the outset of the colonial war reached about 2,800 units per month⁵.

In addition to the iconic G-3, this factory produced other military equipment. The FMBP was tasked with producing several other weapons, such as the Heckler & Koch HK-21 machine gun (based on the G-3), the Portuguese-made FBP m/947 machine gun, defensive and offensive hand grenades (m/62 and m/63), and 60 mm, 81 mm and 120 mm mortars. Portugal began producing the HK-21 when the Armed Forces required an automatic support weapon. In 1967, there was a proposal to produce it at the FMBP and it began coming out of the production line the following year, with a production target of 4,000 units in less than two years (Afonso & Gomes, 2010, p. 404). Another product that was produced in large quantities were hand grenades, which may have reached over 300,000 units per year in 1973 (it was not possible to ascertain the exact numbers). As for mortars, particularly the Portuguese-made 60 mm mortar, almost 1,600 units were produced before the war ended, and, while it was not possible to ascertain the exact numbers, the ammunition for them would have been in the order of hundreds of thousands (Afonso & Gomes, 2010, p.404; Tavares, 2005, p.209).

The FMBP was tasked with sustaining the war effort at the expense of the company's commercial activity, in a case of strategic capitalisation of a company in the face of economic difficulties. Rather than being managed like an autonomous business, the factory was managed according to guidelines defined by the State (Tavares, 2005, pp.81-83)⁶. The weapons produced by the FMBP for the Armed Forces, as reported in January 1974, are provided in Table 1 (Tavares, 2005, p.206).

Table 1 – Total number of weapons supplied by the FMBP to the Armed Forces

Weapons	Client				Total	Date of first filled order
	Army	Navy	Air Force	Others ⁷		
<i>G-3</i>	257.409	8.985	4.465	27.536	298.395	1962
<i>HK 21</i>	6.692	100	241	276	7.309	1968
<i>FBP m/963</i>	6.234	-	-	994	7.228	1963
<i>60mm mortar</i>	718	-	39	53	810	No date

Source: Tavares (2005).

⁵ This value was obtained by dividing the number of G-3 units produced in 1973 by 12 months.

⁶ As Tavares (2005, pp.81-82) explains, military factories were run according to management principles that were similar to those of private companies and were "legally entitled to full administrative and financial autonomy, [but were?] subject to financial auditing by the Court of Auditors, ?and their commercial decisions regarding sales to foreign clients? had to be authorised by the government. ?These factories also had an obligation not to compete with other private companies and had to? carry a 6 to 12 months' supply of raw materials."

⁷ Embora Tavares apresente uma relação bastante detalhada da produção de armamento na FMBP (elaborada a partir de dados recolhidos no AHMDN (Cx 7 165, Peça nº 4)), o destino das unidades inscritas em "Outros" não é explicitado. Essa omissão minoritária, contudo, não traz prejuízo à análise proposta neste ensaio, uma vez que a função provedora da FMBP para as Forças Armadas permanece suficientemente demonstrada. O aprofundamento empírico destes valores pode, contudo, ser objeto de eventuais investigações futuras mais focadas na atividade industrial desta fábrica.

4.2. *Metalúrgica Duarte Ferreira*

The second case study addresses the metalwork factory *Metalúrgica Duarte Ferreira* (MDF), a company that played an important role in the war effort by manufacturing medium and heavy tactical transport vehicles for the Portuguese Armed Forces. The start of the conflict in Africa highlighted the need for large quantities of such vehicles, and that need was only expected to grow as the war progressed. In fact, the General Secretariat of National Defence, in a document dated April 1962, identified the need to “procure over 1,800 military vehicles for overseas operations” (1962, cited in Monteiro, 2012, p.19). However, Portugal had difficulty obtaining this equipment due to the arms embargo, and the equipment that it did manage to acquire from Germany and France was costly (even though it met the requirements and was delivered in a timely manner). The search for alternatives to these vehicles, which were essential to the forces on the ground, led to the development of an alternative solution: to produce them domestically through the MDF. In 1964, the company began assembling trucks in the town of Tramagal, near Abrantes, where it opened a factory with over 50,000 m² and 2,000 workers, “at a time when only 36 Portuguese companies had more than a thousand employees” (P. M. Monteiro, 2018, p.8).

Before the war, the MDF mainly produced “agricultural machinery and components for the rail and automotive industries” (P. M. Monteiro, 2012, p. 19). At the turn of the 1960s, the company began assembling (and later producing) tractors and heavy cargo and passenger vehicles (P. M. Monteiro, 2012, p.19, 2018, pp.8-9). It was through this industrial conversion that the MDF was able to become a military contractor. It did so by acquiring a licence from French heavy vehicle manufacturer Berliet for the production of a model that could be used by the Armed Forces in the overseas territories: “simple, low-cost vehicles that could be produced in large quantities in a short period of time” (P. M. Monteiro, 2012, p.19). Out of this partnership was born the Berliet-Tramagal family of trucks. Not long after the first model was showcased in 1964, the factory began producing an order of 450 units to be delivered between June 1965 and February 1966 (P. M. Monteiro, 2018, p.9).

The first of these models, the GBC 8 KT 4 with two axles and four wheel drive, was based on the original French version with the same name. It had four wheel drive and “carried a payload of up to four tons or twenty fully geared soldiers” (P. M. Monteiro, 2012, p. 19). The GBC was powered by a 7,900 cc Magik M520 engine with 125 hp and had a range of 800 km. It had the advantage of having a polycarbonate engine that could run on different types of fuel, and there are even reports that it could run on unusual fuels such as palm oil, turpentine and even champagne (P. M. Monteiro, 2012, p.19, 2018, p.16). About 1,670 units of this first model were produced. Only two years later, in 1966, a new version of the GBC 8 KT with six wheel drive was introduced. A total of 972 units were produced and 50% of production was done domestically (P. M. Monteiro, 2012, pp.19-20).

A few years later, in 1968, the factory began producing a third lighter and smaller model, the GBA MT. The GBA MT was essentially the same vehicle as the original GBC with a few differences that resulted from the operational experience gained in Africa. The changes improved the vehicle’s durability, strength, and economy when compared to its predecessor. Not only was it one tonne lighter than the GBC (7,250 kg vs. 8,370 kg), the GBA also had a six

wheel drive and was powered by a more economical and slightly more powerful M420/30X diesel engine (135 hp). Despite having a lower payload capacity than the previous model (4,000 kg vs. 4,500 kg), the GBA was able to meet the requirements of the Armed Forces (P. M. Monteiro, 2012, p.20). In early 1974, with 3,000 vehicles on the ground, the Portuguese Army was set to acquire about a thousand additional units. However, the orders eventually stopped with the end of the colonial war.

The Berliet-Tramagal earned the respect of the Portuguese soldiers in Angola, Mozambique and Guinea for its reliability and combat performance, and for its robustness and versatility under intensive operational use and with very little maintenance. Over a period of ten years, between 1964 and 1974, the MDF's production line delivered a total of 3,549 Berliet-Tramagal trucks (of the three models)⁸, most of which were used by the Army in the African theatres of operations.

4.3. *Bravia, S.A.R.L.*

The last case study of a Portuguese defence factory during the colonial war describes a successful, if rather peculiar example of domestic production of armoured vehicles: Bravia – Sociedade Luso-Brasileira de Veículos e Equipamentos, S.A.R.L. – a Lisbon-based company founded in March 1967 that manufactured special and heavy vehicles.

Since the early stages of the colonial war, the Armed Forces had used armoured vehicles on all fronts, usually for reconnaissance but also to escort military convoys and to open up roads. However, the combat specifications, age and mechanical erosion of the vehicles available to the Armed Forces, such as the Panhard EBR, the Daimler, and the Fox, made them unsuited for these tasks (Afonso & Gomes, 2010, p.400). The fact that the forces on the ground were forced to use improvised vehicles in unsuitable vehicles eventually led to their replacement.

One solution to the problem was the acquisition of the French-made Panhard AML light armoured car, which filled several gaps when it was introduced in 1967. However, the Army still required a versatile wheeled armoured car that could transport personnel and equipment. Inquiries were made and there was even a preliminary contract signed with a US contractor. However, as with other attempts to procure military equipment in that period, the US government did not authorise the deal because Portugal wished to use the vehicles outside the purview of NATO (Machado, 2009, pp.42–43). Faced with the impossibility of purchase in the international market, in March 1967 the Portuguese government, through the Ministry of the Army, sponsored the creation of a company called Bravia S.A.R.L. which was tasked with designing and producing the required vehicles (Machado, 2009, pp.42–43).

The design of the vehicle that would be dubbed Chaimite V-200 by the project manager, Major Donas-Bôtto, was completed soon after. The Chaimite was an almost direct reproduction of the V-100 Commando model produced by the American company Cadillac Gage. In 1966, a team of North American technicians, all former Cadillac-Gage employees,

⁸ This figure was obtained by adding the number of units of each of the three models, as provided in the cited documents: 1,670 GBC (4x4 version), 972 GBC (6x6 version) and 907 GBA (6x6).

arrived in Lisbon. They had been hired by Dônas-Bôtto to replicate the original design in the Portuguese workshops. One of these experts was a chief engineer responsible for the development, design and manufacture of the Commando, who would be arrested on charges of industrial espionage when he returned to the US in 1972 (Machado, 2009, p.44; P. M. Monteiro, 2018, pp.28-29, 32-33). However, in November 1966, Portugal was able to procure a second-hand V-100 from the FRG. This provided an initial contact with the vehicle and accelerated the design of the national version. Preliminary tests were conducted on the German unit, and the first prototype was completed in 1968 and showcased to the Portuguese military. The model was so similar to the original American version that “photographs of the Commando (both of the exterior and interior) were used in the Chaimite manuals” (P. M. Monteiro, 2018, pp.28-31).

The production of the armoured hulls was transferred to *Sorefame (Sociedades Reunidas de Fabricações Metálicas* [United Metalworking Societies]), a company that produced railway materials. The hulls were later assembled at *Oficinas Gerais de Material de Engenharia* [General Engineering Equipment Workshops] (OGME) in Belém. Production was transferred again shortly after, in 1968, when, to meet the production speed requirements of a new order placed by the Army for 56 units, Bravia moved its facilities to Porto Alto after buying the whole capital of the owner of the facilities, a company called *VM - Veículos Motorizados, S.A.R.L.* Overall, the Chaimite was never produced in the quantities expected due to successive factory transfers, logistical difficulties, as well as to some lack of coordination between the manufacturer and the Army (P. M. Monteiro, 2018, p.31).

By late 1970, a total of 18 vehicles had been delivered to the Army, four of which were sent to Guinea at the end of that year to be tested and put and put into service (P. M. Monteiro, 2018, p.31). However, the first results of this experience were disappointing, particularly with regards to the suitability of the weapons and the reliability of some mechanical components. The three vehicles that were sent to Mozambique and the seven sent to Angola from late 1972 onwards performed better (Machado, 2009, pp.45-46). Overall, the experience acquired by procuring technological capabilities through alternative means and by producing them domestically allowed Portugal to obtain new capabilities for the war effort and proved an effective way of strengthening strategic potential in only a few years. Even though it was not deployed in large numbers, the Chaimite not only saw action in the three theatres of operations, but featured in some of the most recognisable scenes of the revolution of 25 April 1974, gaining a truly iconic status in Portugal’s historical memory.

5. The strategic importance of the Portuguese military industries in the colonial war

Having developed the theoretical aspects related to Strategy and the defence industries, and having presented three case studies that illustrate the Portuguese effort to build industrial capabilities for use in the colonial war, this section will address the strategic role of the Portuguese military industry in the conduct of the war effort. First, it will provide a brief account of the activity of each case study and of the processes that were developed to obtain capabilities. Next, the industrial fabric will be categorised according to the concepts used by the defence industry. Finally, the Portuguese military industries in wartime will be analysed

through the lens of Cabral Couto's theoretical concepts to identify the dialectic links between the case studies, genetic strategy and strategic potential.

The case study of the FMBP, a public company controlled by the Portuguese State, showed that the production of arms and ammunition during the war was an example of capacity generation and of strengthening strategic potential. The modernisation of the factory through Portugal's accession to NATO and the financial aid granted under the Marshall Plan, as well as the protocols with the FRG for the production of G-3 and HK-21 machine guns, were crucial to this process. Portugal managed to leverage those assets and capitalise on technology transfers to acquire modern light weapons without resorting to foreign markets. On the other hand, the large production volumes required and the fact that the production was gradually taken over by national factories made it possible to meet the Armed Forces' need for small arms at relatively low costs, without which it would have been difficult to conduct a counterinsurgency campaign in Africa. Overall, the strategic importance of the FMBP stemmed from its role in a genetic strategy based on the activation, development and exploitation of capabilities.

The second case study, which addressed Metalúrgica Duarte Ferreira, provides a different example of strengthening strategic potential. Originally a private company that produced agricultural machinery and civilian heavy vehicles, it was mobilised for the war effort by converting existing civilian capabilities for production of military equipment. In an example of the theoretical relationship between genetic strategy and structural strategy, the MDF used its technical capabilities and links to French company Berliet to create a tactical transport vehicle that met the needs of the Armed Forces. This conversion was not only a successful example of technology transfer and a shortcut to the R&D process, it also enabled Portugal to once again circumvent the restrictions on foreign imports that had been imposed in response to its overseas policy. Thus, the production of the Berliet-Tramagal is an example of strengthening strategic potential mainly through a process of conversion.

The third case study addressed Bravia, S.A.R.L., a private company sponsored by the Ministry of the Army to design and produce a light armoured vehicle for use in the African theatres of operations. Perhaps the most creative of the case studies addressed here, from an early stage, Bravia's activity focused on obtaining foreign technology through somewhat controversial methods. By acquiring a V-100 Commando through indirect channels, Bravia was able to replicate the design of this American armoured vehicle and thus greatly shorten the R&D curve of a vehicle that would have been difficult to develop for the Portuguese industries of the time. Another interesting fact is how adjacent companies – such as Sorefame and VM – were used to produce the Chaimite, which was tested in the African operational theatres. From a strategic perspective, this experience was an example of strengthening potential by activating, developing and exploiting capabilities in a complex, diversified and multi-sectorial mobilisation process.

As for defence industry concepts, the three cases highlighted at several levels the role of a defence contractor. First, the examples consisted on factories that produced small arms and light weapons and even some heavy weapons. While Portugal was not a fully industrialised country and did not initially possess a technological structure capable of designing and

producing this type of equipment, it was nevertheless able to elevate its technical proficiency in favour of the war effort. Second, the case studies revealed substantial R&D shortcuts. As the country lacked many weapons technologies, in order to cut costs and development time, and supply the Armed Forces with large quantities of equipment in the short term, it had to exploit trade-offs, licencing, diplomatic relations and technology transfers. Third, it should be noted that there were spin-in effects generated by intercompany cooperation and dual-use capabilities (in the cases of MDF and Bravia), as civilian resources were used to produce quality military equipment at low costs. Finally, the procurement of military assets by Portugal during the colonial war was influenced by the same financial, economic and technological constraints that affect all small nations. The Portuguese defence industrial base was small and consisted in a few factories that produced parts of conventional light weapons (the equivalent of subcontractors), from which all the capacity-building effort had to be developed.

The relevance of the Portuguese military industry in wartime for the study of Strategy, as shown in the above case studies, can be classified according to three interconnected levels: genetic strategy, strengthening of strategic potential, and relevance to the structural and operational strategies. With regards to the genetic component, it was clear at an early stage that new capabilities would have to be generated to meet the operational and structural requirements of the strategic mission. The onset of the war revealed shortcomings not only in the type of equipment available (both light and heavy) but also in its quantities and quality. The process of generating new capabilities is usually time-consuming and costly, and in its fullest sense is only truly within the reach of powers with substantial economic and technological means. However, despite being a small power, Portugal was able to counter this trend and successfully strengthen its potential by activating, converting and developing its capabilities.

In fact, the Portuguese genetic strategy focused on creating, building and acquiring weapons suitable for its new missions in Africa. Both the small arms produced by the FMBP and the Berliet built by the MDF met the needs of the Armed Forces and were available to the operational strategy in a timely manner. On the other hand, the Chaimite, a more sophisticated equipment, took longer to develop as there were several difficulties and obstacles throughout the process. Overall, the three factories were able to implement the strategic concept adopted by the decision makers – conducting a counterinsurgency campaign – through a process that involved predicting how the conflict would evolve. Moreover, the products were obtained through different methods of capability generation, showing that a genetic strategy does not require large-scale mobilisation of resources, nor is it completely out of the reach of small nations such as Portugal. In fact, it can be argued that the technical ability to adapt existing capabilities to meet a given requirement, as well as to acquire capabilities with certain specifications is already a type of genetic strategy (A. H. Fernandes, email, 15 September 2020). This process occurred both in regards to the produced capabilities and had an impact on the industries themselves, which may also be viewed from a strategic perspective as genetically enhanced capabilities.

Thus, guided by a well-defined genetic strategy, the Portuguese military industries

were able to strengthen the country's strategic potential in a proficient and consistent manner. Doing so required mobilising latent means through three methods described by Strategy theory: activation, conversion, and development and exploitation. These methods were often mixed and were used at different stages of the factories' creative and productive processes. The linkages created as a result of this interaction made it possible to produce the material resources that the Portuguese State required to support its strategy. Finally, the drivers of this process were the economic and sovereignty priorities of state actors, who were able to manipulate the relationship between supply and demand in favour of politically defined objectives.

6. Conclusions

This paper examined the role of the Portuguese defence industries in sustaining the war effort during the period of the colonial war, and assessed their strategic importance according to a set of factors. To that end, two theoretical concepts from the field of Strategy were introduced – genetic strategy and strengthening of strategic potential –, as well as the corresponding concepts used in the defence industry sector. This conceptual exercise used Abel Cabral Couto's theories to categorise Portuguese manufacturing structures according to how they were used to increase strategic potential, and to describe the relationship between the objectives to be achieved and the means created to achieve them. Next, the Portuguese military industrial landscape at the onset of the colonial war was described according to the sector of activity and technological level. Finally, a set of case studies was presented to illustrate the genetic effort undertaken to provide the Armed Forces with the necessary capabilities, analysing their main contributions. This allows for some conclusions.

The first is that there is a link between strategic goals during the colonial war, genetic strategy, and the way strategic potential was strengthened by generating capabilities. The activity of defence industries tends to change drastically from peacetime to wartime. The demand for capabilities increases, there are specific requirements depending on the type of war being fought, and production is intensified to meet the need for war materials. The analysed cases illustrate this process: the role of the national military factories, which in peacetime had operated much like any other company, changed when this productive fabric was mobilised for the war effort.

It is also worth noting that, with regards to the analysed case studies, Portuguese military factories did more than just produce weapons. From the moment the war broke out, they were tasked with providing a prompt and effective response to the ongoing demands of a war that lasted almost fifteen years, which they did through extending its capabilities and creative processes. And while it cannot be said that there was an integrated, long-term, and superiorly defined plan, there was a national effort driven by events that made it possible to generate capabilities and equip the Armed Forces on a scale that was unlikely for a small power on the periphery of the international stage.

The case studies illustrated how Portugal acquired weapons that were initially difficult to procure (in both quality and quantity) in a highly unfavourable international climate. The cost of entry, or R&D costs, of the war equipment obtained was covered by exploiting

relationships with foreign allies, by acquiring technology through indirect means, and by putting the industry at the service of the strategic priorities of war. This alignment of capabilities and needs enabled the use of value chains to obtain products under more advantageous conditions, which resulted in important technological and financial shortcuts.

The equipment produced by Portuguese factories were of similar quality to those produced internationally, and their creative spirit and technical level proved invaluable in sustaining the war effort. In fact, Portugal was not given preferential treatment, but it also never matched the great powers of that time in terms of industrial strength. Nevertheless, it was largely able to become militarily self-sufficient through a creative process that helped it sustain, against all odds, a counterinsurgency campaign in Africa, in three fronts and for thirteen years.

Therefore, it can be argued that Portugal implemented a genetic strategy, as described by Abel Cabral Couto, by combining the available resources (the national military factories and their business networks) with those that could be acquired (by procuring the technological and industrial resources required to enhance their capacities), and by filling the gaps as the national possibilities allowed (by designing and producing the capabilities that could not be acquired from the international market). As a result, the political and military decision makers were able to overcome Portugal's isolation on the international stage since late 1960 by mobilising the national industry for the war effort, and thus accomplish the State's political and strategic objectives.

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