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NOTA EDITORIAL

Com a edição do presente número da Revista de Ciências Militares (RCM) e da correspondente versão em inglês, *Portuguese Journal of Military Sciences*, o Núcleo Editorial do Instituto Universitário Militar (IUM) inicia o ano de 2025 prosseguindo com a divulgação semestral da investigação na área das Ciências Militares e da Segurança e Defesa.

Os artigos constantes na presente edição constituem estudos inovadores e diversificados, incidindo sobre o comportamento cultural, social e organizacional das forças de segurança, a segurança marítima, a engenharia dos materiais e as plataformas não tripuladas e sistemas de missão autónomos. Contribuem, por isso, para o aprofundamento destas áreas de investigação e dos desafios decorrentes no emprego das Forças Armadas Portuguesas e das Forças de Segurança no quotidiano.

O primeiro estudo explora a cultura organizacional e os valores institucionais das Forças de Segurança, com o objetivo de delinear a cultura internacional dessas Forças a partir de cada um dos valores institucionais das corporações investigadas. A investigação evidencia que a cultura organizacional é constituída por valores institucionais essenciais, como o comprometimento, lealdade, honra, respeito, disciplina, espírito de sacrifício e coragem, mas também por valores adjacentes como o profissionalismo, respeito pelos direitos humanos, qualidade, transparência, humanidade, imparcialidade e a justiça.

O segundo estudo analisa a pesca ilegal não declarada e não regulamentada no Atlântico Sul, onde o crescimento desta atividade se perfila como uma das mais relevantes ameaças à segurança e bem-estar das populações daquela região. O estudo evidencia o impacto da crescente escassez de recursos haliêuticos na segurança humana das populações, levando a um potencial aumento de atividades ilícitas e a um comprometimento da segurança marítima da região do Atlântico Sul.

O terceiro estudo apresentado, investiga o fabrico aditivo no apoio à manutenção militar, focando-se num modelo conceptual para a simulação deste tipo de fabrico na cadeia logística militar. O estudo desenvolve-se no contexto dos veículos blindados de transporte de pessoal de um batalhão mecanizado, revelando que a dinâmica do sistema de fabrico aditivo depende da intensidade da demanda de peças, da manutenção e do tamanho das peças a serem impressas e que o material original dessas peças afeta a capacidade de apoio da manutenção com recurso ao fabrico aditivo.

O quarto e último estudo desta edição, aborda a integração dos *Unmanned Aircraft Systems* (UAS) no tráfego aéreo geral em Portugal, consubstanciando um estudo comparativo entre os EUA e a Europa que apresenta um sistema de apoio para o *U-Space* e o respetivo espaço aéreo, as infraestruturas necessárias e as entidades que o regulam. O estudo identifica a necessidade de publicar regulamentação sobre o *U-Space*: espaços aéreos, infraestruturas, sistemas, entidades reguladoras e respetiva integração no espaço aéreo nacional.

Acreditamos que os estudos reunidos na presente edição da Revista de Ciências Militares constituem contributos relevantes para o conhecimento científico em Ciências Militares, incentivando uma análise crítica e aprofundada sobre as funções, obrigações e complexidades que hoje se impõem

às forças militares, num cenário global em constante transformação. Esperamos proporcionar aos leitores uma experiência de leitura enriquecedora e informativa, que favoreça a reflexão crítica e a compreensão aprofundada dos temas abordados.

O Comandante do IUM

Pedro Miguel de Sousa Costa
Vice-Almirante

EDITOR'S NOTE

With the publication of the present issue of the Portuguese Journal of Military Sciences (PJMS) and its corresponding Portuguese version, *Revista de Ciências Militares*, the Editorial Office of the Military University Institute (IUM) begins the year 2025 by continuing with the biannual dissemination of research in the field of Military Sciences and Security and Defense.

The articles contained within this issue are innovative and diverse studies, focusing on the cultural, social and organizational behavior of security forces, maritime security, materials engineering and unmanned platforms and autonomous mission systems. They therefore contribute to a more profound comprehension of these domains of research and the challenges that arise from the engagement of the Portuguese Armed Forces and Security Forces in everyday life.

The initial study investigates the organizational culture and institutional values of the Security Forces, with the objective of delineating the international culture of these Forces based on each of the institutional values of the corporations investigated. The extant research indicates that organizational culture is comprised of two types of values: core institutional values, including commitment, loyalty, honor, respect, discipline, spirit of sacrifice, and courage; and adjacent values, including professionalism, respect for human rights, quality, transparency, humanity, impartiality, and justice.

The second study analyzes illegal, unreported, and unregulated fishing in the South Atlantic, where the growth of this activity is regarded as one of the most significant threats to the security and well-being of the region's populations. The study highlights the impact of the growing scarcity of fishery resources on the human security of populations, leading to a potential increase in illegal activities and jeopardizing maritime security in the South Atlantic region.

The third study presented investigates the use of additive manufacturing in support of military maintenance, focusing on a conceptual model for simulating this type of manufacturing in the military logistics chain. The study is carried out in the context of the armored personnel carriers of a mechanized battalion, revealing that the dynamics of the additive manufacturing system are contingent upon the intensity of demand for parts, maintenance, and the dimensions of the parts to be printed and that the original material of these parts affects the ability to support maintenance using additive manufacturing.

The fourth and final study in this issue deals with the integration of *Unmanned Aircraft Systems* (UAS) into general air traffic in Portugal. Constitutes a comparative analysis between the United States of America and the European Union, with a view to presenting a support system for *U-Space* and its airspace, the necessary infrastructure, and the bodies that regulate it. The study identifies the need to publish regulations on *U-Space*, including airspace, infrastructure, systems, and regulatory bodies, as well as its integration into national airspace.

It is our conviction that the studies compiled in this edition of the Portuguese Journal of Military Sciences are relevant contributions to scientific knowledge in the field, encouraging a critical and in-depth analysis of the functions, obligations and complexities that are currently imposed on the

military forces in a global scenario that is in constant flux. We hope to provide readers with an enriching and informative reading experience, with a focus on critical reflection and the promotion of a more grounded and broadened understanding of the subjects covered.

IUM Commander

Pedro Miguel de Sousa Costa
Vice-Admiral

ARTIGOS CIENTÍFICOS
SCIENTIFIC ARTICLES

CULTURA ORGANIZACIONAL EM CORPORAÇÕES POLICIAIS: UM DELINEAMENTO ORIENTADO PELOS VALORES INSTITUCIONAIS

ORGANIZATIONAL CULTURE IN POLICE CORPORATIONS: A DESIGN GUIDED BY INSTITUTIONAL VALUES

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Resumo

Os valores institucionais integram a essencialidade da cultura organizacional, em especial nas organizações policiais, em face de suas especificidades, como o conservadorismo, o tradicionalismo, o insulamento, etc. Diante desse contexto, o objetivo geral do presente artigo foi delinear a cultura internacional da Polícia, a partir de cada um dos valores institucionais das corporações investigadas. Demarcou-se como objeto de estudo os valores organizacionais da Polícia, limitando-se às “polícias de rua”, ou seja, aquelas que exercem o caráter ostensivo de preservação da ordem pública. A pesquisa teve natureza exploratória, de cunho qualitativo, baseada em análise bibliográfica e documental. Seguiu-se um raciocínio indutivo com análise dos valores institucionais de 12 corporações selecionadas em 11 países. O desafio posto foi responder à questão central - quais valores institucionais atuais são representativos da cultura nas organizações policiais em todo o mundo? Os principais resultados evidenciaram que a cultura organizacional é constituída por valores institucionais essenciais, como comprometimento, lealdade, honra, respeito, disciplina, espírito de sacrifício e coragem, tanto quanto por valores adjacentes como profissionalismo, respeito aos direitos humanos, qualidade, transparência, humanidade, imparcialidade e justiça.

Palavras-chave: cultura organizacional; valores institucionais; organizações policiais; polícia de rua; gestão

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Abstract

Institutional values are an essential part of organizational culture, especially in police organizations, given their specific characteristics, such as conservatism, traditionalism, isolation, etc. Given this context, the general objective of this article was to outline the international culture of the Police based on each of the institutional values of the corporations investigated. The organizational values of the Police were demarcated as the object of study, being limited to the "street police", that is, those that exercise the ostensible character of preserving public order. The research had an exploratory character, of a qualitative nature, based on bibliographic and documentary analysis. An inductive reasoning was followed with an analysis of the values of 12 selected corporations in 11 countries. The challenge was to answer the central question - which current institutional values are representative of the culture in police organizations around the world? The main results showed that the organizational culture is made up of core institutional values such as commitment, loyalty, honor, respect, discipline, spirit of sacrifice and courage, as well as adjacent values such as professionalism, respect for human rights, quality, transparency, humanity, impartiality and justice.

Keywords: *organizational culture; institutional values; police organizations; street police; management*

1. Introdução

A cultura organizacional emergiu como um quesito relevante da Gestão no ocidente, há aproximadamente 45 anos, quando o Japão passou a se destacar pelas suas práticas de controle de qualidade. Na concepção de Mintzberg et al (2000), a cultura representa a mente da organização e, portanto, é direcionadora de decisões, de estratégias, de posturas, de atitudes e de como os recursos são utilizados. A cultura pode-se manifestar por crenças e pressupostos, valores, mitos, linguagem e símbolos de comunicação, cerimônias e rituais, tabus, normas e formalidades, heróis e atitudes das lideranças (Schein, 1984). O que se estabelece como objetivo geral nesta investigação é delinear a cultura internacional da Polícia, a partir de cada um dos valores institucionais das corporações investigadas.

Dentre as manifestações culturais citadas, os valores das organizações policiais serão o objeto analisado, por serem instituições onde a cultura é externalizada de forma mais contundente em função de seus princípios e crenças bem característicos, tradicionais e conservadores. Em que pese a existência de valores históricos fortes e mais densos nas organizações policiais, sua cultura precisa ser monitorada para evitar o descompasso e promover o consequente alinhamento com as mudanças em curso no mundo exterior, pois a sobrevivência em longo prazo tem como pressuposto a convergência com as forças externas (Johann, 2013). Em vista disso, conhecer e diagnosticar a cultura organizacional é fundamental para que ela possa ser gerenciada, renovada e atualizada.

Justifica-se a presente investigação pelo fato de a cultura organizacional ser considerada um fator crítico de sucesso da gestão (Lisboa et al., 2013) e consequentemente, quando os

seus valores são favoráveis, potencializam o desenvolvimento organizacional (Fernandes, 2023). Tem a capacidade de impactar na eficácia e na eficiência de uma companhia (Rodríguez & Alcover, 2003) e seu diagnóstico é essencial, constituindo-se uma das ferramentas fundamentais na área da gestão e da mudança (Albino et al., 2022; Aktaş et al., 2011). Portanto, a relevância acadêmico-científica caracteriza-se, não somente pela originalidade, mas sobretudo, por suprir um hiato na confluência de duas áreas do saber - a Gestão e a recente Ciência Policial, em face da escassa literatura acerca dos valores institucionais atuais que caracterizam genericamente a cultura internacional da Polícia.

Em face da existência de inúmeras instituições policiais no mundo, com uma pluralidade de *core business* (polícia científica, polícia de fronteiras, polícia de finanças, polícia marítima, polícia portuária, polícia de estrangeiros, polícia penal, polícia legislativa, polícia da moralidade, dentre outras), tornou-se necessário demarcar a categoria de polícia a ser analisada. Assim sendo, dentro das inúmeras modalidades existentes, delimitou-se às “polícias de rua”, ou seja, a corporação policial que apresenta características no desenvolvimento de funções, como a prevenção criminal, a manutenção da ordem e o combate diário e ininterrupto à desordem em espaços públicos, sendo elas a visibilidade, a proximidade e a emergência (Gonçalves, 2007). Portanto, a motivação e a justificativa para a escolha desta categoria de polícia residem no seu caráter de acessibilidade, de presença e de pronto atendimento, tornando-a a mais conhecida pelo público.

Numa brevíssima digressão histórica, a “polícia de rua”, tal qual se conhece hoje, remonta ao século XIX, especificamente em 1829 na Inglaterra, e surgiu como um divisor de águas entre os arcaicos sistemas de policiamento circunstanciais, realizados pelos vigias noturnos, atores privados, etc, e o policiamento público (Batitucci, 2010). Nasceu como uma corporação policial profissional, civil, hierarquizada, preventiva, diuturna, que viria a ser um símbolo de modernidade policial (Gonçalves, 2017).

Após a delimitação da modalidade de polícia a ser analisada, definiu-se por questão central desta investigação - quais valores institucionais atuais são representativos da cultura nas organizações policiais em todo o mundo? Quanto aos objetivos específicos: o primeiro consiste em identificar conceitos, níveis e formas de manifestação da cultura organizacional; o segundo visa expor a cultura das organizações policiais por meio de características e da sua universalidade entre as corporações policiais; o terceiro pretende demonstrar os valores por meio dos seus conceitos, importância e tipologia; e, por fim, o quarto e último busca relacionar e comparar os valores institucionais entre 12 corporações policiais no mundo.

Quanto aos aspectos metodológicos, trata-se de uma investigação exploratória, de natureza qualitativa, com análise documental e levantamentos bibliográficos como técnicas de coleta de dados. O método de abordagem indutivo foi o procedimento lógico utilizado e a técnica de análise de dados foi a comparativa. Os investigadores trilham o seguinte percurso: seleção de países, escolha de corporações policiais em cada país selecionado, identificação da declaração de valores nos países escolhidos, comparação e análise das declarações de valores e delineamento da cultura organizacional da polícia com base nos valores analisados.

Com a pretensão de responder à questão central, a presente investigação foi construída em cinco capítulos. O primeiro refere-se a presente introdução; o segundo faz alusão a revisão da literatura e aborda a cultura organizacional, a cultura nas organizações policiais e os valores institucionais. O terceiro capítulo detalha a metodologia utilizada para o alcance dos objetivos propostos; o quarto expõe a apresentação dos dados e discussão dos resultados. Por fim, o quinto e último capítulo traz a conclusão desta pesquisa.

O presente artigo foi redigido à luz do acordo ortográfico de língua portuguesa em vigor no Brasil.

2. Enquadramento teórico e conceitual

2.1. Cultura organizacional

A cultura organizacional é temática multidisciplinar, pois, é tratada na ótica de diversas áreas do conhecimento como a Sociologia, a Antropologia, a Psicologia e principalmente pela Gestão, como é o caso da presente investigação. Para Hofstede (1994), a cultura organizacional é fruto das relações com o seu ambiente externo, não sendo possível entendê-la sem conhecer as nuances de relacionamento com a sociedade e principalmente com os públicos com os quais mantém relação institucional. No entendimento de Schein (1984) trata-se de premissas relevantes, criadas ou adaptadas por um agrupamento ao deparar-se com situações externas e internas complexas que foram bem sucedidas o bastante para serem incorporadas e transmitidas aos novos integrantes, como forma de entendimento coletivo em relação a essas situações, cuja decodificação ou interpretação pode ser realizada por meio de alguns elementos, denominados de indicadores ou sinalizadores, tais como: as convicções, as normas, o uniforme, os símbolos, o layout, o logotipo, os slogans, os rituais, etc. O somatório desses sinalizadores é tido como um grande referencial que se solidifica ao longo do tempo e revigora a cultura, e pode ser percebido pelo percurso institucional.

No entendimento de Fleury e Fleury (1995, p.27) a cultura na organização “tem a capacidade de ordenar, atribuir significações e construir a identidade organizacional”. Já o estudioso Edgar Schein, que se dedicou a investigar a cultura no âmbito das organizações, interpreta e clarifica o entendimento de cultura organizacional como um

conjunto de pressupostos básicos que um grupo inventou, descobriu ou desenvolveu ao aprender a lidar com os problemas de adaptação externa e integração interna, e que funcionaram bem o suficiente para serem considerados válidos e ensinados a novos membros, como a forma correta de perceber, pensar e sentir em relação a esses problemas. (Schein, 2001, p. 9)

A cultura também contribui no processo de socialização de novos membros, na medida em que incute valores, visando uma convergência de interesses organizacionais e individuais (Sousa, 2009). Para Schein (2004) a cultura é estratificada em três níveis nas organizações, conforme estágios de complexidade (figura 1), nomeadamente: os artefatos, compostos por símbolos mais visíveis e externos, como por exemplo o layout, o logotipo, os comportamentos informais, etc; os valores, representados por crenças e convicções que norteiam procedimentos, direcionam

comportamentos e orientam a formulação da identidade organizacional; os pressupostos, que integram o nível mais complexo da cultura, são menos perceptíveis à interpretação e podem ser exemplificados, como os tabus (Silva, 2017; Sousa, 2009).



Figura 1 – Níveis de cultura organizacional

Fonte: adaptado de Schein (2001)

Algumas variáveis poderão constituir-se em indicadores (ver quadro 1), com a intenção de parametrizar a cultura organizacional, a saber: crenças e pressupostos, valores institucionais, mitos, linguagem e símbolos de comunicação, solenidades e ritualística, tabus, formalidades e regulamentos, heróis e comportamento da liderança (Schein, 1984).

Quadro 1 – Indicadores de cultura organizacional

Indicadores	Explicação
Crenças e pressupostos	São entendimentos geralmente implícitos. São verdades que norteiam condutas, sem que haja obrigatoriamente alguma formalização por parte da organização.
Valores institucionais	É a formalização daquilo que a organização dissemina como sua crença. Não há obrigatoriamente coincidência entre o que é declarado e o que se pratica.
Mitos/lendas	É o que se divulga sobre a história da organização, baseado geralmente na interpretação de narrativas, e portanto não há garantia de que seja fiel à realidade.
Linguagem e símbolos de comunicação	São elementos que visam transmitir alguma imagem da organização, como cores heráldicas, logomarcas, veículos, arquitetura de prédios, tipos de uniforme, mobiliário, etc.
Solenidades e ritualística	São cerimônias e atos solenes realizados com regularidade que fortalecem a cultura, tornando-a mais explícita, o que evidencia valores e potencializa mitos, pressupostos e crenças.
Tabus	São comportamentos e atitudes considerados intoleráveis na organização. Podem ser escritos ou não e integram as crenças daquilo que se considera inadmissível.
Formalidades e regulamentos	São normas escritas de comportamentos, atitudes, etc. Geralmente possuem sanções para o descumprimento das regras e conduta inadequadas.

[Cont.]

Heróis/lendas	São pessoas que protagonizaram a história da organização e encarnam os valores e consequentemente a cultura organizacional.
Comportamento da liderança	É a atitude dos líderes e não faz alusão ao que se fala ou ao que se prega, mas ao que se faz. O que importa é o exemplo de postura e não o discurso.

Fonte: adaptado de Schein (2001)

Todavia, dentre todas as manifestações culturais apresentadas por Gonçalves e Campos (2012), os valores organizacionais têm especial relevância nesta investigação e por essa razão integram o objeto de estudo. Os valores são parte integrante e essencial da identidade organizacional que pode ser definida pelo “conjunto estruturado de atributos culturais que estão relacionados entre si e expressam a forma como a organização se apresenta aos seus públicos interno e externo” (Polícia Militar de Minas Gerais, 2020, p. 12). Segundo Fascioni (2010, p. 26), a identidade organizacional se traduz no conjunto de atributos que “torna uma empresa realmente especial, é a sua essência, seus princípios, crenças, manias, defeitos, qualidades, aspirações, sonhos, limitações”. Deste conceito pode-se inferir duas premissas importantes sobre a identidade organizacional: forte componente cultural e formalizada pela alta direção da organização.

2.2. Cultura nas organizações policiais

As corporações policiais são impactadas internamente pela sua cultura, ensejando uma espécie de controle informal, a previsibilidade e a padronização de comportamentos, condutas e atitudes. É dotada de “certas crenças e atitudes amplamente compartilhadas entre várias organizações policiais ao redor do mundo” (Oliveira Junior, 2007, p. 165). Ensina Reiner (2004) que a cultura policial é norteadas por algumas premissas, como o senso de cumprimento da missão, o senso de desconfiança, a ausência de interação social e a solidariedade interna. Para Oliveira Júnior (2011), a solidariedade e o fechamento social na polícia constituem-se características centrais de sua cultura.

O estilo de gestão, as políticas emanadas pela liderança, bem como as próprias estratégias, por exemplo, são manifestações da cultura organizacional, que também podem ser representadas pelos procedimentos e processo de seu compartilhamento (Fernandes, 2017). Corroboram com esta assertiva Silva (2017, p. 76) quando afirma que “as polícias militares possuem uma fortíssima e arraigada cultura organizacional e que todos os processos deveriam considerá-la, sob pena de subsumirem diante de sua força”; e Silva Neto (1997) quando faz a seguinte abordagem sobre a cultura na PMMG:

tem efeito em sua produção ou prestação de serviços. É ela que determina como as decisões são tomadas, como os recursos são usados e empregados e como é sua reação frente ao ambiente ao qual a organização produz ou presta os seus serviços. (p. 14)

Quanto a importância da cultura organizacional na seara da Polícia, pode-se identificar pelo menos três razões para tal. A primeira é que qualquer mudança a ser encetada perpassa

pelo entendimento e conhecimento da cultura e suas nuances (Silva, 2017). A segunda é que a cultura explica, em grande parte, como a Polícia pensa e age (Sousa, 2009). E a terceira razão é que ela influencia, de forma contundente, o desempenho organizacional (Mintzberg et al. 2000; Schein, 2001; Silva Neto, 1997). Os valores que dão vida à cultura, na Polícia, geralmente nascem de seus ritos cerimoniais, regulamentos, práticas operacionais, processos de formação e treinamento, sobretudo pelo processo de inserção e sociabilização de novos integrantes (Silva Neto, 1997, Sousa, 2009).

Apesar de haver valores reconhecidamente universais estimulados não somente na seara interna das organizações, mas no âmbito geral, como a idoneidade moral, a integridade, o decoro, etc., é essencial que haja o reconhecimento e o compartilhamento explícito dos valores fundamentais para a prática da atividade policial, como um integrante vital de sua identidade. Algumas especificidades balizam a cultura na Polícia, como o espírito de corpo, a sagacidade, a suspeição e o senso de tradição (Silva Neto, 1997). A ausência de integração social também pode ser apontada como um traço nas corporações policiais e que no entendimento de Skolnick & Fyfe (1993) é evidente pela grande aversão à intervenção externa.

Tendo em vista que as convicções, os princípios e os comportamentos compõem os processos e as rotinas do trabalho nas organizações policiais, estes geralmente são disseminados por seus integrantes, que se colocam numa situação diferenciada em relação a membros de outras organizações (Fernandes, 2017). Diante do exposto, Rico e Salas (1992) entendem que existe uma cultura que dinamiza valores da atividade policial e, conforme os mesmos autores, isso ocorre em função das características próprias da Polícia, como a configuração paramilitar, a solidariedade interna, os procedimentos de aculturação de novos membros e a rotina padrão de trabalho.

As organizações policiais possuem robusta identidade cultural, compartilhando internamente densos princípios e valores no decorrer de sua trajetória institucional, o que desvela enormes barreiras às mudanças mais rápidas e significativas, demonstrando seu perfil conservador, burocrático, corporativista e centralizador. A Polícia também possui similaridade característica com as organizações militares, como a unidade, o espírito de corpo, a solidariedade, o tradicionalismo e a ritualística, dentre outras.

Vale enfatizar a ritualística e a estética militar nas corporações policiais, pois elas potencializam a prática de vários outros princípios imprescindíveis ao exercício das atividades de polícia ostensiva de preservação da ordem pública, como “o respeito e a observância às normas, tornando seus integrantes profissionais diferenciados por seu comprometimento com a prestação de serviços e com a defesa da cidadania” (Fernandes, 2023, p.149). Pelo fato de a Polícia constituir-se em força aprestada, com grande capacidade de mobilização, de prontidão diuturna, treinada, armada, geralmente capilarizada e baseada no princípio da pronta obediência, a estética militar contribui significativamente para o seu adequado emprego e controle (Fernandes, 2023).

A própria estrutura interna das organizações policiais já evidencia alguns valores e, conseqüentemente, traços culturais, como uma hierarquia rígida, ritualização de comportamentos, treinamento padronizado, regras formais e doutrinas (Oliveira Júnior, 2011).

As organizações policiais são fortemente marcadas por um ethos militar o que é reforçado por Bittner (1970, p. 52), quando afirma que normalmente elas evocam um modelo “quase-militar”. A estética e a ritualística militares são reforçadas por Camargo (1997) que enfatiza a relevância de tais quesitos da seguinte forma:

estética militar não se confunde com cultura bélica; estética militar é necessária para internalização dos valores da disciplina e da hierarquia; e a estética militar nas instituições policiais é fator de garantia do respeito aos direitos dos cidadãos. (p. 4)

Conforme Monjardet (2002), baseando-se nos valores essenciais das organizações policiais, enquanto ocupação laborativa, o policial possui uma dimensão bem superior à de qualquer outra profissão:

o trabalho do engenheiro, do técnico ou do operário pode ser compreendido (até prova em contrário) sem se referir a seu sistema de valores pessoal, ou ao sistema de valores coletivos do grupo ao qual ele pertence [...]. Não se pode, à primeira vista, compreender assim o trabalho do policial. (Monjardet, 2002, p. 162-163)

Skolnick (1994) destaca que os policiais constroem relacionamentos recíprocos de autoridade com a população, caracterizando traços culturais que ultrapassam as fronteiras nacionais, configurando uma identidade profissional mundial do que é “ser policial”. Tal entendimento é corroborado por Wood et al. (2004) ao verificarem que alguns pressupostos são disseminados por grande parte dos policiais, conformando um tipo de modelo padrão entendido como a base da identidade policial e referência para outras subculturas. De acordo com Oliveira Júnior (2007, p. 103), “há algo em comum na experiência ou atividade policial que acaba por favorecer a emergência de uma forma peculiar de conceber seu trabalho, sua relação com a sociedade e com a população criminosa”. Nesse sentido, percebe-se que os valores policiais ultrapassam todos os limites geográficos nacionais, constituindo-se uma identidade profissional universal que pode ser estendida para quaisquer regiões e civilizações.

2.3. Os valores institucionais

São fenômenos que orientam o dia a dia organizacional e norteiam o comportamento de seus membros em todos os níveis hierárquicos (Paz & Tamayo, 2004). Podem ser entendidos como convicções e princípios de conduta, sendo aquilo que se acredita e pratica, além de integrarem o coração da sua cultura. São virtudes desejáveis ou características básicas positivas que deseja preservar, adquirir e/ou incentivar. Os valores institucionais integram a construção da identidade da organização e contribuem no estabelecimento do que ela é e a forma como ela se percebe, além de permitir a previsibilidade de seu funcionamento e o comportamento de seus integrantes, e, por essa razão, são tão valiosos para a identidade organizacional (Sousa, 2009). Desta forma, os valores, juntamente com outras manifestações culturais como os rituais e as normas, fornecem um senso de direção comum a todos que integram o mesmo ambiente corporativo (Sousa, 2009).

O estudo dos valores é interdisciplinar, sendo investigado em vários campos do conhecimento, como na Filosofia, na Administração, na Psicologia, na Sociologia, no Direito, etc. (Fernandes, 2023). São expressos pela alta gestão por meio de uma declaração e traduzem,

ou deveriam traduzir, o que se propaga como suas crenças. Assim, não há, necessariamente, uma correspondência direta entre o que é declarado e o que é praticado (Gonçalves & Campos, 2012). Vale frisar que a doutrina policial se constitui numa importante fonte para a construção da declaração de valores institucionais.

O modelo de análise da identidade organizacional AC2ID, explica melhor o hiato que pode haver entre o real e o que é compartilhado. Para Balmer e Greyser (2002) existem cinco identidades em qualquer organização (AC2ID): a Atual, a Comunicada, a Capturada, a Ideal e a Desejada. Havendo manifesta e deliberadamente incompatibilidade entre o que é real e o que se compartilha como verdadeiro, a corporação está diante do que se considera uma verdadeira peça de ficção (Fascioni, 2010).

Alguns outros aspectos devem ser enfatizados quanto a importância dos valores institucionais. O primeiro deles é em relação a gestão das partes interessadas, pois, segundo Freeman e McVea (2001), é fundamental olhar para fora, visando identificar e investir nos relacionamentos que viabilizam o sucesso duradouro. De acordo com os mesmos autores, as partes interessadas somente podem cooperar se, apesar de suas diferenças, compartilharem os mesmos valores. Assim, para uma relação bem-sucedida entre elas, deve haver a incorporação de valores comuns (Freeman & McVea, 2001). O segundo aspecto é a capacidade dos valores de direcionar e balizar também a formulação e a implementação das estratégias. A organização precisa saber quem ela é para depois definir o que fazer (Stimpert et al., 1998), assertiva corroborada por Tavares (2010) quando afirma que a estratégia começa pela convergência com os valores institucionais.

Os pesquisadores identificaram uma tipologia dos valores que se traduz numa classificação apresentada por diversos estudiosos sobre o assunto. Esta tipologia encontra-se sintetizada no quadro 2. Schwartz (1992) estabeleceu uma categorização quanto aos objetivos perseguidos e identificou quatro eixos: relação bipolar entre a ênfase na independência de pensamento e de ação e o favorecimento da mudança e a submissão, auto restrição e proteção das práticas tradicionais e de estabilidade pessoal. Gondim e Tamayo (1996) classificaram quanto às dimensões e apresentaram quatro tipos: cognitiva, motivacional, hierárquica e funcional. Já Paz e Tamayo (2004) identificaram oito tipos quanto ao âmbito da valorização: realização, conformidade, domínio, bem-estar do empregado, tradição, prestígio, autonomia, preocupação com a coletividade. E por fim Johann (2013) identificou duas possibilidades quanto a durabilidade: ideologia central e valores adjacentes.

Quadro 2 – Tipologia dos valores organizacionais

Autor/ classificação	Tipo	Explicação
Schwartz (1992) Quanto aos objetivos perseguidos	Abertura à mudança	Relação bipolar entre a abertura à mudança e aos valores que formam a conservação
	Conservação	
	Autopromoção	Abertura à mudança versus conservação e autopromoção versus autotranscendência
	Autotranscendência	

[Cont.]

Gondim e Tamayo (1996) Quanto as dimensões	Cognitiva	Crenças, princípios, convicções, etc.
	Motivacional	Objetivos, metas, desafios, interesses e preferências
	Hierárquica	Distinção entre o que é essencial e secundário
	Funcional	Orientação comportamental. O que é ético ou não
Paz e Tamayo (2004) Quanto a esfera da valorização	Realização	Valoriza o desempenho/meritocracia
	Conformidade	Valoriza o respeito às normas e o bom comportamento
	Domínio	Valoriza os resultados
	Bem-estar interno	Valoriza o bom ambiente de trabalho
	Tradição	Valoriza a tradição e os costumes
	Prestígio	Valoriza a imagem externa
	Autonomia	Valoriza a criatividade e a inovação
	Cuidado com o grupo	Valoriza a justiça e a equidade
Johann (2013) Quanto a duração	Ideologia central	Resistentes, fortes, autênticos, nobres e duradouros
	Adjacentes	Mutáveis conforme evolução das mudanças do ambiente

Fonte: adaptado de Gondim e Tamayo (1996), Johann (2013), Paz e Tamayo (2004) e Schwartz (1992)

Para Gondim e Tamayo (1996), os valores organizacionais podem ser hierarquizados entre o que é considerado importante ou prioritário e o que é secundário. Nesse mesmo sentido, para Johann (2013) os valores podem ser divididos em ideologia central e adjacentes. A ideologia central é constituída pelos valores mais fortes, autênticos, nobres, duradouros, perenes e que transcendem ao tempo. São capazes de caracterizar a personalidade da organização, possuindo um forte conteúdo histórico-cultural, sendo comuns em instituições seculares, tradicionais e conservadoras como a Igreja, o Exército e as próprias organizações policiais. É considerada “uma camada pétrea da identidade, de conteúdo imutável” (Johann, 2013, p.148).

Por conseguinte, os valores que abarcam a ideologia central são pouquíssimos, sujeitos às mudanças ambientais, e devem ser capturados internamente, uma vez que independem dos cenários. Quanto aos valores adjacentes, estes são agregados no decorrer da trajetória da organização em sua evolução e em face das adaptações motivadas pelas mudanças externas, possibilitando-lhe “um reposicionamento estratégico-cultural frente a novas situações e desafios” (Johann, 2013, p.162).

Desta forma, a presente investigação foi norteada pelas classificações de Gondim e Tamayo (1996) e de Johann (2013), tendo em vista que os valores institucionais identificados em corporações policiais foram comparados e interpretados quanto aos que são essenciais e adjacentes.

3. Metodologia

Esta pesquisa abordou a cultura organizacional em corporações policiais com base em seus valores institucionais e partindo do pressuposto de que os valores policiais ultrapassam todas as fronteiras nacionais, constituindo uma identidade profissional internacional do ser

policial (Oliveira Júnior, 2007; Skolnick, 1996; Wood et al., 2004), utilizaram-se os métodos e técnicas a seguir.

3.1. Métodos e técnicas

O método de abordagem utilizado foi o indutivo, pois, para Lakatos e Marconi (2003, p.86), “indução é um processo mental por intermédio do qual, partindo de dados particulares, suficientemente constatados, infere-se uma verdade geral ou universal, não contida nas partes examinadas”. O objetivo dos argumentos indutivos é levar a conclusões cujo conteúdo seja muito mais amplo do que o das premissas nas quais se basearam. Desta forma, os valores institucionais identificados nas corporações investigadas, permitem estendê-los para as demais, visando atingir o objetivo geral e responder à questão central. Para a coleta de dados foram utilizados levantamentos bibliográficos e análise documental, tratando-se de uma investigação qualitativa e exploratória quanto aos objetivos.

Utilizou-se a técnica de análise comparativa das declarações de valores de corporações policiais em 11 países. Entretanto, para aquelas que não as apresentaram, estes foram extraídos e interpretados por meio da declaração da missão ou da visão. Assim, os investigadores entenderam que, seguindo essa trajetória, com um recorte bem heterogêneo de países e corporações policiais, foi possível delinear, em linhas gerais, a cultura organizacional da Polícia em todo o mundo, por meio de comparação dos valores institucionais das corporações policiais investigadas.

Isto posto, baseando-se nessa combinação de métodos e técnicas, os investigadores propuseram um breve modelo de análise (figura 2), que se traduz em um ferramental metodológico que visa facilitar a busca da solução do problema formulado, bem como o alcance do objetivo geral.

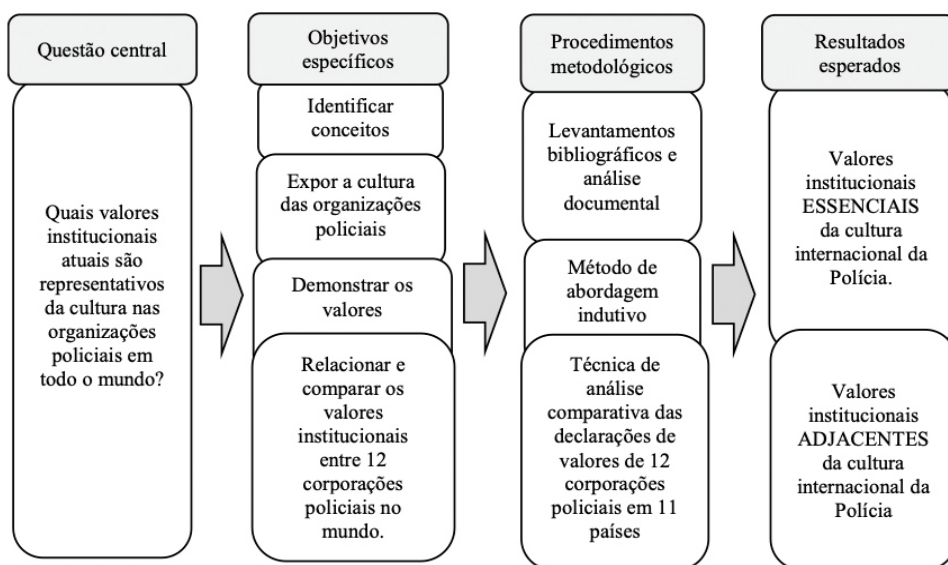


Figura 2 – Modelo de análise

Quanto aos critérios de recorte para a investigação, foram necessários defini-los para países e para corporações policiais, conforme segue.

3.2. Critérios de recorte por países

Relativamente aos países, foram selecionados 11 que se revelassem bem heterogêneos, baseando-se no desenho institucional do Estado quanto ao sistema de governo (presidencialista, parlamentarista e semipresidencialista) e quanto à forma de Estado (unitário, federal e confederado). Além do desenho institucional buscou-se ainda os quesitos de localização geográfica por continentes (Américas do Norte e do Sul, Europa, África e Ásia), quanto a extensão territorial (alta, média e baixa) e quanto à civilização.

No que diz respeito às civilizações, para (Huntington, 1996) a política mundial seria reconfigurada seguindo linhas culturais, étnicas, religiosas e linguísticas de vários povos, quais sejam: ocidental, sino-confuciano, islâmico, hindu, latino-americano, eslavo-ortodoxo, japonês, africano, budista e insular. Desta forma, foram escolhidos países de cinco continentes, três sistemas de governo, duas formas de Estado, três extensões territoriais e cinco civilizações, conforme quadro abaixo.

Quadro 3 – Países selecionados

País	Continente	Sistema de Governo	Forma de Estado	Extensão territorial	Civilização
Inglaterra	Europa	parlamentarista	unitário	média	ocidental
Portugal	Europa	semipresidencialista	unitário	pequena	ocidental
Espanha	Europa	parlamentarista	unitário	média	ocidental
África do Sul	África	parlamentarista	unitário	alta	africana
Estados Unidos	América do Norte	presidencialista	federado	alta	ocidental
Brasil	América do Sul	presidencialista	federado	alta	latino-americana
Chile	América do Sul	presidencialista	unitário	média	latino-americana
Alemanha	Europa	parlamentarista	federado	média	ocidental
Índia	Ásia	parlamentarista	federado	alta	hindu
Jordânia	Ásia	parlamentarista	unitário	pequena	islâmica
Nigéria	África	presidencialista	federado	alta	islâmica

3.3. Critérios de recorte por corporações policiais

No tocante às corporações policiais, foram selecionadas 12 organizações nos países elencados em duas variáveis tipológicas apresentadas por Emsley (1999): quanto a natureza (civil ou militar) e quanto a subordinação ao nível de governo (local, estadual ou central). As corporações selecionadas foram as seguintes: *Metropolitan Police*, *Guarda Nacional Republicana*, *Polícia de Segurança Pública*, *Guardia Civil*, *South African Police Service*, *Los*

Angeles County Sheriff's Department, Polícia Militar de Minas Gerais, *Carabineros de Chile*, *Bayerische Polizei*, *Kerala Police*, *Public Security Directorate* e a *Nigeria Police Force*.

Destarte, trata-se de uma seleção heterogênea e representativa, pois são oriundas de distintas regiões do planeta, de natureza civil ou militar, de diversidade tipológica quanto aos modelos policiais, pertencentes a países com díspares desenhos institucionais e de culturas bem diferentes.

Diante do exposto, foram selecionadas corporações policiais, sendo cinco de cariz militar e sete de estatuto civil quanto a natureza e duas locais, três estaduais e sete centrais quanto a subordinação ao nível de governo. O quadro abaixo demonstra as corporações policiais selecionados conforme os critérios citados.

Quadro 4 – Corporações policiais analisadas

País	Corporações policiais	Variáveis tipológicas	
		Quanto a natureza	Quanto a subordinação
Inglaterra	<i>Metropolitan Police</i>	Civil	local
Portugal	Guarda Nacional Republicana	militar	central
	Polícia de Segurança Pública	Civil	central
Espanha	<i>Guardia Civil</i>	militar	central
África do Sul	<i>South African Police Service</i>	Civil	central
Estados Unidos	<i>Los Angeles County Sheriff's Department</i>	Civil	local
Brasil	<i>Polícia Militar de Minas Gerais</i>	militar	estadual
Chile	<i>Carabineros de Chile</i>	militar	central
Alemanha	<i>Bayerische Polizei</i>	Civil	estadual
Índia	<i>Kerala Police</i>	Civil	estadual
Jordânia	<i>Public Security Directorate</i>	militar	central
Nigéria	<i>Nigeria Police Force</i>	civil	central

4. Apresentação dos dados e discussão dos resultados

Foram definidas 12 corporações policiais, observando-se a heterogeneidade e a representatividade, pois são oriundas de diferentes regiões do planeta, de natureza civil ou militar, de diversidade tipológica quanto aos modelos policiais, pertencentes a países com diversos desenhos institucionais e de culturas bem distintas, as quais serão brevemente apresentadas: *Metropolitan Police*, Guarda Nacional Republicana, Polícia de Segurança Pública, *Guardia Civil*, *South African Police Service*, *Los Angeles County Sheriff's Department*, Polícia Militar de Minas Gerais, *Carabineros de Chile*, *Bayerische Polizei*, *Kerala Police*, *Public Security Directorate* e a *Nigeria Police Force*.

A *Metropolitan Police* (Polícia Metropolitana de Londres) foi criada em 1829, e é responsável pelo policiamento na grande Londres, exceto a cidade de Londres, que é policiada pela

City of London Police (Fernandes, 2023). É mais conhecida como *Scotland Yard*, e teria sido, segundo Miller (1999), a precursora a prevenir o crime, adotando estratégias da ostensividade da patrulha e o policiamento diuturno, ao invés das intervenções reativas de prisões de delinquentes. A *Metropolitan Police*, de natureza civil, foi referência para diversas outras corporações policiais nos Estados Unidos e também para países que integraram ex-colônias do vasto Império Britânico (Mendonça & Dantas, 2016).

A Guarda Nacional Republicana (GNR) e a Polícia de Segurança Pública (PSP) integram o modelo português denominado napoleônico (ou dualista), articulando-se numa corporação de natureza militar e outra de natureza civil, respectivamente. Ambas são consideradas “polícias de rua”, não havendo distinção quanto ao papel de preservação da ordem pública e se distinguem, basicamente, quanto à atuação geográfica, pois, enquanto a GNR tem responsabilidade nas cidades de menor população, no meio rural e no trânsito rodoviário, a PSP atua nos maiores centros urbanos (Fernandes, 2023).

A GNR possui uma responsabilidade territorial que abrange aproximadamente 94% do território e 54% da população portuguesa (GNR, 2020; Silva, 2013). A PSP tem atuação em grande parte das áreas urbanas e processa cerca de 52% da criminalidade geral e aproximadamente 70% da criminalidade violenta em Portugal (Poiares, 2018).

A *Guardia Civil* (Guarda Civil) e o *Cuerpo Nacional de Policía* (Corpo Nacional de Policía) constituem a espinha dorsal do sistema dualista espanhol, seguindo as mesmas premissas do modelo português. Enquanto a *Guardia Civil*, de cariz militar, atua em cidades menores, no meio rural e no trânsito rodoviário, o *Cuerpo Nacional de Policía*, de natureza civil, desenvolve atribuições nos grandes centros. A *Guardia Civil* se faz presente em todas as regiões do país, com mais de 2,000 instalações e um quadro de efetivos superior a 80,000 policiais, tendo como missão: proteger as pessoas contra os atos criminosos; o cumprimento das leis, levando à justiça quem as não cumpre; garantir a liberdade para o exercício dos direitos e preservar a segurança dos cidadãos (*Guardia Civil*, s.d.).

A *South African Police Service* (SAPS), remonta sua criação a 1995, em substituição da Força Policial Sul Africana (SAP), no momento do término do regime de segregação racial (*apartheid*), sendo a corporação responsável pela preservação da ordem na África do Sul. A reforma policial foi motivada pelo histórico negativo de intervenções policiais que vigorou no país durante o período do *apartheid* (Carrera Neto, 2020), e sua configuração hierárquica, até então militar, foi remodelada, passando a ser bem parecida com a britânica, mas voltou, em 2017, a ser militarizada. A SAPS é nacional e articula-se em nove serviços provinciais, possui mais de 1,100 agências policiais e os comandantes de província (Comissários Provinciais), subordinam-se ao Comissário Nacional (Carreira Neto, 2020).

A *Los Angeles County Sheriff's Department* (LASD), é responsável pelo policiamento no condado de Los Angeles e possui competência territorial na metade das 88 cidades do condado, sendo que a outra metade é servida pelos departamentos de polícia locais. Além do policiamento e da investigação criminal, possui ainda como atribuições a guarda do Tribunal de Justiça, a manutenção dos estabelecimentos penais, a escolta de presidiários e o trânsito da região metropolitana de Los Angeles (Carrera Neto, 2020). Vale ressaltar que o modelo estadunidense

é bem fragmentado e está articulado no âmbito dos municípios, dos condados, dos estados e do governo federal (Dantas & Mendonça, 2022; Sanderson, 2016). Todavia, as polícias locais, de condados e os xerifados, exercem o papel de prevenção criminal e, consequentemente, de “polícia de rua”, sendo portanto, a base do sistema policial naquele país.

A Polícia Militar de Minas Gerais (PMMG) constitui uma das 27 corporações policiais de preservação da ordem pública existente no país. O Brasil edificou ao longo do seu período republicano uma estrutura policial, baseada na federação, com 27 unidades, havendo a existência de duas corporações policiais em cada uma delas. Desta forma, existe uma “polícia de rua” e outra investigativa, respectivamente a Polícia Militar e a Polícia Civil, o que torna o modelo bipartido em preventivo e investigativo e não de ciclo completo. A Constituição brasileira ainda prevê outras três instituições subordinadas ao governo federal: a Polícia Federal, a Polícia Rodoviária Federal e a Polícia Ferroviária Federal, além da nova Polícia Penal, criada em 2019 e presente nas duas esferas de governo (estadual e federal).

Na presente investigação, optou-se pela PMMG como amostra no Brasil, por três motivos, sendo o primeiro pelo destaque dentre as demais polícias militares quanto ao foco na área de gestão e em desenvolvimento organizacional, que pode ser demonstrado pelos escritórios de gestão estratégica (*office of strategy management*) e de gestão de projetos (*project management office*) existentes na sua estrutura orgânica (Silva, 2017). O segundo em razão de possuir declaração de valores desde o ano de 2004, o que permitiu aos investigadores lastro histórico de informações. E por fim, por ter sido destacada pelo Tribunal de Contas da União no ano de 2020, como “referência para o Modelo de Avaliação de Governança e Gestão em Segurança Pública” (Fernandes, 2023).

Os *Carabineros* exercem o papel de “polícia de rua” no Chile e são a principal e mais tradicional corporação policial do país. Foram criados em 1927 e nasceram em decorrência de um movimento de forte militarização da atividade policial nos últimos dois séculos, visando uma estratégia de modernização para um policiamento mais controlado e disciplinado em um regime de exceção (Rocha, 2014). O modelo chileno é constituído por uma corporação que exerce as atividades investigativas (PDI) e outra que exerce as atividades de prevenção criminal (*Carabineros*). A corporação dos *Carabineros* é subordinada ao governo central, militar tal qual as Forças Armadas e exerce com exclusividade as atividades de preservação da ordem pública no país (Fernandes, 2023).

A *Bayerische Polizei* (Polícia da Bavária) é uma das 16 “polícias de rua” que atua em cada estado da Alemanha. A Constituição alemã está consolidada em sua *Grundgesetz* (Lei Fundamental), a qual prevê a federação como forma de Estado e consequentemente estabelece a competência da preservação da ordem pública em cada uma das 16 unidades federadas (Carrera Neto, 2020). Além das polícias existentes em cada Estado, as *Landespolizei*, o sistema policial do país, conta, segundo Carrera Neto (2020), com três polícias federais: a *Bundespolizei* (Polícia Federal), a *Bundeskriminalant* (Polícia Federal de Investigação) e a *Polizei des Deutschen Bundestags* (Polícia do Parlamento Alemão). A *Bayerische Polizei* é a *Landespolizei* que atua no maior Estado alemão – a Baviera, e atende uma população de 13 milhões de habitantes. Em virtude da federação constituir-se na forma de Estado na Alemanha, cada corporação policial possui suas normas específicas, procedimentos, protocolos, etc. (Carrera Neto, 2020).

A *Kerala Police* constitui uma das 28 polícias estaduais do modelo indiano, país que segue um arranjo federativo. Cada Estado da República da Índia possui a sua “polícia de rua”, como os modelos brasileiro e alemão, comandadas por um Diretor Geral de Polícia que se reporta ao Ministério do Interior de cada Estado. A exceção fica por conta da Polícia de Delhi, que está subordinada ao governo central. Dentre as polícias estaduais, destaca-se a *Kerala Police*, pertencente ao Estado de Kerala, que possui os melhores índices de segurança pública do país (Kerala Police, 2020). A *Kerala Police* também tem sido referência para reformas encetadas em outras corporações policiais na Índia (Kerala Police, 2020).

A *Public Security Directorate* é a única corporação de polícia ostensiva de preservação da ordem pública na Jordânia, possui estatuto militar e atua em todo o território nacional. A Jordânia é um país localizado na Ásia, situado quase na tríplice divisa entre os continentes africano, asiático e europeu, possuindo a monarquia constitucional unitária como sistema de governo. A última reforma no sistema policial do país ocorreu em 2019, ocasião em que todas as forças de segurança então existentes foram unificadas para a criação da *Public Security Directorate* (Public Security Directorate, s.d.).

A *Nigeria Police Force* é a única “polícia de rua” no país, subordinada ao governo central, possui estatuto civil e é comandada por um Inspetor Geral de Polícia, designado pelo Presidente da República. A corporação é comandada, em cada um dos Estados federados, por um Comissário da Polícia (Nigeria Police Force, 2023). A Nigéria é um país localizado na África Ocidental, sendo uma república federativa integrada por 36 estados federados. É o país mais populoso do continente e uma potência econômica regional.

Após a seleção de países e de corporações policiais, o passo seguinte foi a identificação dos valores institucionais de cada corporação para que pudessem ser analisados e comparados. O quadro a seguir denota a declaração de valores de cada uma das corporações investigadas.

Quadro 5 – Declaração de valores de corporações policiais

Corporação policial	Declaração de valores
<i>Metropolitan Police</i>	Profissionalismo, integridade, coragem e compaixão
Guarda Nacional Republicana	Conhecimento e inovação, união, competência, lealdade, disciplina e transparência
Polícia de Segurança Pública	Rigor, disciplina e sentido do dever; humanismo; defesa intransigente da legalidade e isenção na ação policial; rejeição de qualquer forma de extremismo ou discriminação; compromisso com a missão
<i>Guardia Civil</i>	Honra, serviço, disciplina, lealdade e companheirismo
<i>South African Police Service</i>	Imparcialidade, cortesia, honestidade, respeito, transparência e responsabilidade
<i>Los Angeles County Sheriff's Department</i>	Respeito pela dignidade de todas as pessoas; integridade para fazer o que é certo e lutar contra o que é errado; sabedoria para aplicar o bom senso; e justiça e coragem para enfrentar o racismo, sexismo, antisemitismo, homofobia e intolerância em todas as suas formas.
<i>Polícia Militar de Minas Gerais</i>	Honra, profissionalismo, hierarquia, disciplina militar e patriotismo e abnegação

[Cont.]

<i>Carabineros de Chile</i>	Vocação de serviço público, patriotismo, honra, polícia permanente, espírito de sacrifício, espírito de justiça, lealdade, versatilidade, tradição, espírito de corpo e companheirismo
(*) <i>Bayerische Polizei</i>	Comprometimento, honra, humanização, espírito de sacrifício, respeito, lealdade, imparcialidade, companheirismo, profissionalismo, qualidade e respeito aos direitos humanos
(*) <i>Kerala Police</i>	Comprometimento, excelência, transparência, justiça, respeito e respeito aos direitos humanos
<i>Public Security Directorate</i>	Direitos humanos e estado de direito; lealdade e pertencimento; integridade e transparência; segurança participativa e integrativa; profissionalismo e treinamento; institucionalismo em ação; sacrifício e bravura; humanidade e proteção civil; e excelência e criatividade
(*) <i>Nigeria Police Force</i>	Profissionalismo, competência, cooperação, qualidade, proximidade, respeito

(*) Não apresentaram a declaração de valores e por essa razão, os valores identificados foram extraídos e interpretados por meio da declaração da missão ou da visão.

Fonte: Adaptado de *Carabineros de Chile* (2024), *Die Bayerische Polizei* (s.d.), Fernandéz (2017), Guarda Nacional Republicana (2020), *Kerala Police* (2020), *Los Angeles County Sheriff's Department* (2021), *Metropolitan Police* (2020), *Nigeria Police Force* (2023), Polícia Militar de Minas Gerais (2023), Polícia de Segurança Pública (2023), *Public Security Directorate* (s.d.) e *South African Police Service* (2020).

Percebe-se que a forma de descrever os valores não é a mesma para cada corporação. Enquanto algumas citam cada valor institucional, outras os expressaram por meio de frases. Lado outro, alguns enunciados apresentaram valores com teor similar, o que ensejou a necessidade de padronização. Sendo assim, visando facilitar a interpretação e a análise, os pesquisadores procederam dois ajustes: extração em cada frase do valor ou dos valores correspondentes e uniformização daqueles com significado análogo, conforme quadro a seguir.

Quadro 6 – Padronização dos valores similares identificados

Valores similares	Valores correspondentes padronizados
• Sentido do dever • Compromisso com a missão • Vocação de serviço público	Comprometimento
• Rejeição de qualquer forma de extremismo ou discriminação • Respeito pela dignidade de todas as pessoas • Direitos humanos e estado de direito • Coragem para enfrentar o racismo, sexismo, antissemitismo, homofobia e intolerância em todas as suas formas	Respeito aos direitos humanos
• Espírito de sacrifício • Abnegação	Espírito de sacrifício
• Qualidade • Excelência	Qualidade
• Humanidade • Humanismo • Humanização • Compaixão	Humanidade

[Cont.]

• Imparcialidade • Isenção	Imparcialidade
• Coragem para enfrentar o racismo, sexismo, antissemitismo, homofobia e intolerância em todas as suas formas • Coragem • Bravura	Coragem
• Participação • Segurança participativa	Participação
• Polícia permanente	Constância
• Inovação • Criatividade	Inovação
• Equidade • Isonomia	Equidade

Procedidos os ajustes necessários, verifica-se que nas 12 corporações pesquisadas, foram identificados 36 valores distintos, quais sejam: “profissionalismo”, “integridade”, “coragem”, “humanidade”, “conhecimento”, “inovação”, “união”, “competência”, “lealdade”, “transparência”, “respeito aos direitos humanos”, “comprometimento”, “legalidade”, “imparcialidade”, “honra”, “companheirismo”, “cortesia”, “honestidade”, “respeito”, “responsabilidade”, “sabedoria”, “justiça”, “hierarquia”, “disciplina”, “patriotismo”, “constância”, “espírito de sacrifício”, “versatilidade”, “tradição”, “espírito de corpo”, “equidade”, “pertencimento”, “participação”, “qualidade”, “proximidade” e “cooperação”. Dentre estes, 14 foram apontados por três ou mais corporações e classificados pelos investigadores em essenciais e adjacentes, conforme o quadro a seguir.

Quadro 7 – Valores mais frequentes nas corporações policiais

Valores institucionais identificados	Nº de corporações	Classificação	
		Essencial	Adjacente
Comprometimento	5		
Lealdade	5		
Profissionalismo	5		
Respeito aos direitos humanos	5		
Honra	4		
Respeito	4		
Disciplina	4		
Espírito de sacrifício	4		
Qualidade	4		
Transparência	4		
Humanidade	4		
Imparcialidade	4		
Coragem	3		
Justiça	3		

No conjunto dos valores apresentados por essas corporações, o “comprometimento”, a “lealdade”, o “profissionalismo” e o “respeito aos direitos humanos” são comuns em cinco instituições. Oito deles são comuns em quatro corporações, quais sejam: a “honra”, o “respeito”, a “disciplina”, o “espírito de sacrifício”, a “qualidade”, a “transparência”, a “humanidade” e a “imparcialidade”. Dois valores estão presentes em três corporações, a saber: a “coragem” e a “justiça”. Apesar da “hierarquia” ter sido citada por apenas uma corporação, há entendimento, por força cultural, doutrinária e legal nas polícias, que ela pertence ao binômio atrelado à “disciplina” (Fernandes, 2023). As organizações policiais, sejam elas de cariz civil ou militar, têm como pilares a “hierarquia” e a “disciplina”, que enfatizam a obediência às regras profissionais bem como ao superior hierárquico (Sousa, 2009).

À vista disso, retomando a classificação dos valores institucionais quanto à ideologia central/essenciais e adjacentes (Johann, 2013), evidencia-se que os valores integrantes da ideologia central da Polícia encontrados nas organizações policiais investigadas, são: “comprometimento”, “lealdade”, “honra”, “respeito”, “disciplina/hierarquia”, “espírito de sacrifício” e “coragem”. Tais constatações são semelhantes aos valores identificados nas polícias militares no Brasil, quais sejam: a “disciplina”, a “hierarquia”, o “respeito”, a “honra” e a “coragem” (Fernandes, 2023). Adiante, breves apontamentos sobre cada um dos valores identificados como pertencentes à ideologia central da Polícia.

Destaca-se o “comprometimento”, apresentado também como “sentido do dever”, “compromisso com a missão” e “vocação de serviço público”. Para Reiner (2004, p. 136-137), a “característica central da cultura policial é um sentido de missão. É o sentimento de que o policiamento não é apenas um trabalho, mas um meio de vida com um propósito útil [...]”. Visando ilustrar a importância do “sentido de missão”, pesquisa realizada no Brasil junto a policiais militares da capital do Estado de Minas Gerais, demonstrou que 87% creem que sua profissão é, mais do que outras, primordial para a sociedade, 61% relataram que só aqueles que têm vocação podem ser policiais militares e 70% concordam existir protocolos e técnicas que só os policiais conhecem (Oliveira Júnior, 2011).

Relativamente à “lealdade”, faz parte da ética policial, que enfatiza a importância da lealdade à família, ao cidadão, ao superior e ao subordinado, enfim à instituição (Sousa, 2009). Este valor deve expressar, além do comportamento, uma resposta atitudinal, constituída por componentes cognitivos e afetivos, considerados importantes nos relacionamentos da organização policial e entre os seus integrantes (Polícia Militar de Minas Gerais, 2020). No que tange a “honra”, deve nortear a conduta do policial dentro e fora da atividade profissional. A *Guardia Civil* preconiza que a “honra”, enquanto valor institucional, se traduz na qualidade moral que leva ao cumprimento mais exato do dever para com os outros e consigo mesmo, devendo inspirar todos os atos daqueles que compõem a comunidade (Silvelo, 2015).

O “respeito”, que se traduz na consequente observância às normas, é valor essencial à atividade de preservação da ordem pública, o que denota engajamento com a prestação de serviços e com a defesa da cidadania (Fernandes, 2017). Dentre as corporações investigadas, o “respeito”, foi um dos valores mais prevalentes, o que demonstra sua essencialidade na

cultura policial, sobretudo para o cumprimento da missão. Pode ser definido como deveres em relação a quem serve na corporação e a quem se serve – o cidadão e a sociedade, com a utilização do potencial profissional do policial e sua capacidade de respeitar e garantir os direitos fundamentais das pessoas (Polícia Militar de Minas Gerais, 2020).

No tocante à “disciplina” e à “hierarquia”, constituem-se em valores defendidos por Camargo (1997, p. 4) ao afirmar que “são indispensáveis para administração pública; (...) são necessárias para controlar a tropa”. Conforme Bretas (1997) as polícias modernas são referências de estrutura burocrática que inclui, além dos aludidos princípios, o pressuposto da eficiência. Posto isto, com a sua profissionalização, o trabalho de manutenção da ordem e combate ao crime exige procedimentos, técnicas, disciplina e hierarquia (Oliveira Júnior, 2011).

Quanto ao “espírito de sacrifício”, decorre do próprio “comprometimento”, pois, a renúncia pessoal é justificável para o cumprimento da missão de preservação da ordem pública e da incolumidade das pessoas e do patrimônio. A ideia de “guerra contra o crime” também demonstra o “comprometimento” e o “espírito de sacrifício” (Oliveira Júnior, 2011). No que diz respeito à “coragem”, a valentia, o destemor, a bravura, o arrojo ou outro adjetivo qualquer, deve pautar as ações do policial mesmo que com o sacrifício da própria vida (Sousa, 2009). A PMMG definiu “coragem” como a própria bravura e firmeza, força ou energia moral que leva a afrontar os perigos (Fernandes, 2023).

Os outros valores também apontados na investigação, possuem um caráter adjacente e são frutos das transformações socioculturais e dos cenários globais que se apresentam como o aumento da exigência da população por serviços públicos de qualidade; empoderamento dos atores sociais em face do aumento do nível de escolaridade, do acesso à informação e da inclusão digital; a participação e a mobilização social crescentes para pressionar serviços públicos de qualidade; o aumento da complexidade da demanda por políticas públicas; e o crescimento da temática da diversidade social e cultural na agenda política e nas organizações (Fernandes, 2023).

Além disso, o atual Estado de Direito apresentou restrições e maior controle da atividade policial, o que conformou um novo conceito baseado nos princípios da dignidade da pessoa humana, da legalidade, da justiça, da liberdade e da segurança (Afonso, 2018). Tais princípios, frutos da dinâmica política e social, estão suscitando e continuarão a fomentar mudanças culturais na Polícia, despontando outros valores, tais como os identificados nesta pesquisa: “profissionalismo”, “respeito aos direitos humanos”, “qualidade”, “transparência”, “humanidade”, “imparcialidade” e “justiça”.

Portanto, a questão central que balizou toda a pesquisa - quais valores institucionais atuais são representativos da cultura nas organizações policiais em todo o mundo, foi devidamente respondida pelos 14 valores identificados, sendo sete essenciais e sete adjacentes.

5. Conclusões

Os investigadores debruçaram sobre a cultura nas corporações policiais, especificamente no olhar voltado para os valores institucionais. O estudo da cultura organizacional com foco nos valores é transdisciplinar, sendo realizado em vários campos do conhecimento, mas nesta

pesquisa enquadra-se na lente da Gestão e na Ciência Policial, pois, os valores institucionais na Polícia desvendam, em grande parte, como ela pensa e age, ou seja, seus processos de planejamento, organização, direção, controle e conseqüentemente a sustentação de sua estratégia. O que se propôs foi delinear a cultura internacional da Polícia, a partir de cada um dos valores institucionais das corporações investigadas.

O objeto de estudo foi restringido aos valores institucionais atuais das organizações “policiais de rua”, ou seja, apenas as corporações que exercem as atividades ostensivas de preservação da ordem pública. Consistiu-se em um estudo exploratório, qualitativo, bibliográfico, baseado em análise documental, de raciocínio lógico e comparativo entre 12 corporações policiais de 11 países, cujos parâmetros de escolha visaram um recorte diverso e representativo, tanto para países quanto para as corporações. Os critérios foram o modelo do sistema policial; a extensão e a localização geográfica; o desenho institucional e a civilização.

Em síntese, verificou-se: i) uma tipologia de valores organizacionais quanto aos objetivos perseguidos, às dimensões, a esfera da valorização e a durabilidade; ii) a existência de uma cultura constituída por valores organizacionais essenciais e adjacentes. Os essenciais consistem em características comuns, quase universais às organizações policiais, sendo densos, bem típicos, tradicionais e conservadores. Já os adjacentes, que apesar de não integrarem a ideologia central, são igualmente importantes, pois respondem às mudanças e aos cenários atuais e futuros; iii) a presença de inúmeros traços comuns quanto aos valores institucionais, apesar da diversidade de corporações policiais investigadas.

As constatações e resultados encontrados atendem ao objetivo geral e oferecem respostas para a questão central que balizou toda a pesquisa - quais valores institucionais atuais são representativos da cultura nas organizações policiais em todo o mundo. Desta forma, os valores institucionais que, via de regra, conformam a cultura organizacional nas corporações policiais são: “comprometimento”, “lealdade”, “honra”, “respeito”, “disciplina/hierarquia”, “espírito de sacrifício” e “coragem”. Concluiu-se, também, que outros valores não menos importantes e não integrantes da essência da cultura policial terão relevância e espaço cada vez maiores em função dos cenários futuros, como “profissionalismo”, “respeito aos direitos humanos”, “qualidade”, “transparência”, “humanidade”, “imparcialidade” e “justiça”.

E por fim constatou-se, ainda, a partir das corporações policiais investigadas, a alta prevalência do “respeito”, sobretudo em relação aos direitos humanos, o que o evidencia como um valor adjacente extremamente relevante e que tende a ser consolidado na cultura policial no longo prazo, em face da temática global da tolerância quanto a diversidade social e cultural.

O estudo traz um contributo em face da lacuna existente no âmbito acadêmico-científico, com escassa literatura acerca dos valores institucionais atuais que caracterizam, na generalidade, a cultura da Polícia em todo o mundo. Em termos de limitações, os exemplares utilizados no recorte não são grandes, o que pode gerar alguma distorção, e por essa razão sugere-se outros estudos nesta seara, com uma amostragem bem maior que possa abranger todos os continentes e todas as civilizações não contempladas neste estudo, visando capturar outros valores institucionais.

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ORGANISATIONAL CULTURE IN THE POLICE: AN OUTLINE BASED ON INSTITUTIONAL VALUES

CULTURA ORGANIZACIONAL EM CORPORAÇÕES POLICIAIS: UM DELINEAMENTO ORIENTADO PELOS VALORES INSTITUCIONAIS

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Abstract

Institutional values are an essential part of organizational culture, and is especially important in police organizations, which are characterised by conservatism, traditionalism, isolationism, etc. This article aims to provide an outline of an international Police culture based on the institutional values of the corporations analysed here. The study topic is the organisational values of the Police, and specifically, of “beat police” forces, that is, the police officers that have a visible role in preserving public order. The study used a qualitative exploratory research strategy and a literature review to collect the data. Inductive reasoning was the method chosen to analyse the institutional values of 12 corporations from 11 countries. The study aimed to answer the research question: What are the institutional values that currently represent the culture of police organisations in different parts of the world? The findings showed that organisational culture in the Police is rooted in basic institutional values such as commitment, loyalty, honour, respect, discipline, sacrifice and courage, and on adjacent values such as professionalism, respect for human rights, quality, transparency, humanity, impartiality and fairness.

Keywords: organisational culture; institutional values; police organisations; beat police; management

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Resumo

Os valores institucionais integram a essencialidade da cultura organizacional, em especial nas organizações policiais, em face de suas especificidades, como o conservadorismo, o tradicionalismo, o insulamento, etc. Diante desse contexto, o objetivo geral do presente artigo foi delinear a cultura internacional da Polícia, a partir de cada um dos valores institucionais das corporações investigadas. Demarcou-se como objeto de estudo os valores organizacionais da Polícia, limitando-se às “polícias de rua”, ou seja, aquelas que exercem o caráter ostensivo de preservação da ordem pública. A pesquisa teve natureza exploratória, de cunho qualitativo, baseada em análise bibliográfica e documental. Seguiu-se um raciocínio indutivo com análise dos valores institucionais de 12 corporações selecionadas em 11 países. O desafio posto foi responder à questão central - quais valores institucionais atuais são representativos da cultura nas organizações policiais em todo o mundo? Os principais resultados evidenciaram que a cultura organizacional é constituída por valores institucionais essenciais, como comprometimento, lealdade, honra, respeito, disciplina, espírito de sacrifício e coragem, tanto quanto por valores adjacentes como profissionalismo, respeito aos direitos humanos, qualidade, transparência, humanidade, imparcialidade e justiça.

Palavras-chave: cultura organizacional; valores institucionais; organizações policiais; polícia de rua; gestão

1. Introduction

Organisational culture became a relevant topic in management for western countries about 45 years ago, when Japan became famous for its quality control practices. According to Mintzberg et al (2000), culture represents the mind of an organisation, influencing decisions, strategies, attitudes and the way resources are used. Culture can be manifested through beliefs and assumptions, values, myths, language and symbols, formal rituals and celebrations, taboos, procedures and rules, heroes and leadership attitudes (Schein, 1984). This study seeks to provide an outline the international culture of the Police, based on the institutional values of the corporations analysed here.

This study will analyse one of these cultural manifestations, the values of police organisations. In these institutions, culture is highly externalised because their principles and beliefs are typical, traditional and conservative. While there are stronger and more stable values in police organisations, police culture should be scrutinised to avoid misalignments with the changes taking place in the world. Their survival in the long term will depend on their alignment with external forces (Johann, 2013). An organization's culture cannot be effectively managed, renewed and updated without knowing and diagnosing that culture.

This study is relevant because organisational culture is seen as a critical factor in successful management (Lisboa et al., 2013). When its values are positive, culture drives organisational development (Fernandes, 2023) and affects the effectiveness and efficiency of companies (Rodríguez & Alcover, 2003). Therefore, diagnosing it is essential since it is one of

the most important tools in management and change (Albino et al., 2022; Aktaş et al., 2011). The academic and scientific relevance of the study also stems from the fact that few studies have addressed the institutional values that characterise the international culture of the Police today. This work bridges a gap in two areas of knowledge: Management and Police Sciences, a more recent area of study.

There are many types of police institutions. Their core businesses include: scientific police, border police, finance police, maritime police, port police, immigration police, criminal police, legislative police and morality police, among others. Therefore, it was necessary to define which type of police organisation would be analysed in the study. The analysis will address “beat police” forces, that is, police corporations whose duties include preventing crime, maintaining order and combat disorder in public spaces, that is, visibility, proximity and emergency policing (Gonçalves, 2007). This type of policing was chosen because they are the most familiar to the general public thanks to their accessibility, constant presence and ability to take immediate action.

Briefly, “beat policing”, as it is known today, dates back to the 19th century (more specifically, to England, in 1829). It was a milestone that marked the transition from archaic systems of occasional policing by night watchmen, private citizens, etc., and public policing (Batitucci, 2010). Beat policing became the professional, civilian, hierarchical, preventive, full time activity that would become a symbol of modern policing (Gonçalves, 2017).

After defining the type of policing that would be analysed in the study, a research question was formulated: What are the institutional values that currently represent the culture of police organisations in different parts of the world? Specific objectives were set for the study are: 1. identifying the concepts, levels and forms of manifestation of organisational culture; 2. portraying the culture of police organisations through characteristics that are common to all police corporations; 3. categorising values in terms of concepts, importance and typology; 4. establishing relations and comparisons between the institutional values of 12 police corporations from different countries.

The study methodology is an exploratory qualitative research strategy based on a literature review, which was used to collect the data. The logical procedure chosen for this study was inductive reasoning and the technique was a comparative data analysis. First, the authors selected the countries and police forces that would be analysed, after which they identified, compared and analysed the statements of values of each force and created a picture of the organisational culture of the police based on those values.

The study was divided into five chapters that will provide an answer to the research question. The first is this introduction; the second contains the literature review and discusses organisational culture, culture in police organisations and institutional values. The third chapter describes the methodology used to achieve the objectives; the fourth presents the data and discusses the findings. The fifth and final chapter contains the study’s conclusions.

This article complies with the spelling agreement for the Portuguese language currently in force in Brazil.

2. Theoretical and conceptual framework

2.1. Organisational culture

Organisational culture is a multidisciplinary topic. It has been addressed from the perspective of various areas of knowledge, including sociology, anthropology, psychology and, especially, management (which is the case of this study). Hofstede (1994) said that organisational culture is the result of an organisation's relationship with its external environment. To understand it, one must know the nuances of its relationship with society and especially with the target audiences with whom it has institutional relations. According to Schein (1984), culture in organisations refers to the relevant premises a group creates or adapts when faced with complex external and internal situations. When they are successful, they are integrated into the culture and passed on to new members as a form of collective knowledge of what to do in such situations. These premises can be decoded or interpreted using elements known as indicators or signposts. They consist of convictions, rules, uniforms, symbols, layout, logos, slogans, rituals, etc. Collectively, these signposts provide a point of reference that is integrated over time and that rejuvenates the culture. This evolution can be seen by looking at the institution's history.

Fleury and Fleury (1995, p.27) assert that culture has the ability to "order, assign meanings and build organisational identity". Edgar Schein analysed culture within organisations and defined it as a:

[...] pattern of basic assumptions that a given group has invented, discovered or developed in learning to cope with its problems of external adaptation and internal integration, and that have worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems (Schein, 2001, p. 9).

Culture also helps to socialise new members by transmitting values that align organisational and individual interests (Sousa, 2009). Schein (2004) divides culture in organisations into three levels, according to their depth (figure 1): artifacts, which are visible and external symbols such as the layout, the logo, informal behaviours, etc.; values, which are represented by beliefs and convictions that shape procedures, behaviours and the organisation's identity; assumptions, the deepest level of culture, which are less open to interpretation, such as taboos (Silva, 2017; Sousa, 2009).

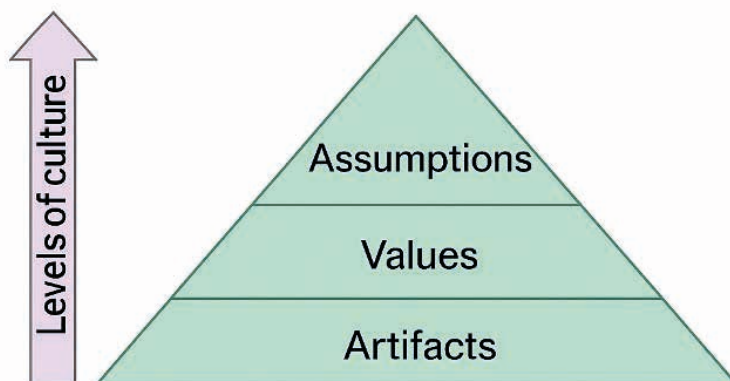


Figure 1 – Levels of organisational culture

Source: adapted from Schein (2001)

Some variables can be used as indicators (see table 1), to measure organisational culture: beliefs and assumptions, institutional values, myths, language and symbols, formal rituals and celebrations, taboos, procedures and rules, heroes and leadership behaviours (Schein, 1984).

Table 1 – Organisational culture indicators

Indicadores	Explicação
Beliefs and assumptions	Perceptions that are usually implicit. They consist of truths that guide behaviour, but are not necessarily formal rules of the organisation.
Institutional values	A formal statement of the organisation's beliefs (what is declared might not be the same as what is practised).
Myths/legends	The stories that are told about the organisation's history, which are usually based on interpreted narratives (which might not be entirely truthful).
Language and symbols	Elements that portray an image of the organisation, such as heraldic colours, logos, vehicles, buildings, uniforms, furniture, etc.
Formal rituals and celebrations	Formal events and functions which are repeated and which serve to strengthen the organisation's culture, making it more explicit, highlighting values and enhancing myths, assumptions and beliefs.
Tabus	Behaviours and attitudes that are not tolerated within the organisation. They can be written or unwritten and include beliefs about what is considered unacceptable.
Procedures and rules	Written rules of behaviour, attitudes, etc. There are usually sanctions for non compliance with the rules and inappropriate behaviour.
Heroes/legends	People who have played an important role in the history of the organisation and embody the organisation's values and culture.
Leadership behaviour	Leaders' attitudes, which refer to what they do, rather than to what they say or declare. That is, a leader's posture, rather than their words.

Source: Adapted from Schein (1984)

Among the cultural manifestations listed by Gonçalves and Campos (2012), organisational values are especially relevant to this investigation. As such, they were chosen as the study topic. Values are an integral and fundamental part of organisational identity, or “a structured set of

cultural attributes that are related to each other and express how the organisation presents itself to its internal and external audiences” (Polícia Militar de Minas Gerais, 2020, p. 12). Fascioni (2010, p.26) defines organisational identity as the attributes that “make a company unique: its essence, principles, beliefs, quirks, flaws, qualities, aspirations, dreams and limitations”. The concept can be inferred from two important premises about organisational identity: a strong culture formalised by the organisation’s leaders.

2.2. Culture in police organisations

Police corporations are influenced by their culture, which provides an informal way to control, predict and standardise behaviours, practices and attitudes. It includes “certain beliefs and attitudes shared by police organisations around the world” (Oliveira Junior, 2007, p. 165). Reiner (2004) points out that police culture is guided by premises, such as a sense of mission, suspiciousness, external isolation and internal solidarity. Oliveira Júnior (2011) agrees that solidarity and social isolation are core elements of police culture.

Management styles, the policies decided by leaders, and the strategies themselves are manifestations of the organisation’s culture, which can also be represented by the procedures and processes through which that culture is shared (Fernandes, 2017). According to Silva (2017, p. 76), “the military police have a strong, deep-rooted organisational culture, which should be integrated in all its processes, otherwise they will not be successful”; and Silva Neto (1997) notes that the PMMG’s culture has an impact on the product or service it provides.

It determines how decisions are made, how resources are used and allocated, and how the organisation reacts to the environment in which it produces goods or provides services. (p. 14)

There are at least three aspects that highlight the importance of organisational culture in law enforcement. The first is that any changes require an understanding and knowledge of the culture and its nuances (Silva, 2017). The second is that culture largely explains how the police think and act (Sousa, 2009). The third is that culture has a powerful influence on the organisation’s performance (Mintzberg et al. 2000; Schein, 2001; Silva Neto, 1997). In the police, the values that shape culture are present in its formal rituals and celebrations, rules, operational procedures and its training and education processes, especially the process through which new members are integrated and socialised (Silva Neto, 1997, Sousa, 2009).

While there are universally-recognised values that are encouraged in organisations (and in general), such as moral character, integrity, decorum, etc., the values that are fundamental to the practice of police duties should be explicitly recognised and shared as a vital part of its identity. Police culture is characterised by specific features that include esprit de corps, discernment, suspiciousness and traditionalism (Silva Neto, 1997). Insularity is also a feature of police corporations. As Skolnick & Fyfe (1993) note, this is clear by these organisation’s resistance to external intervention.

In police organisations, work processes and routines are rooted in convictions, principles and behaviours which are largely shared by their members, who see themselves as different from members of other organisations (Fernandes, 2017). Rico and Salas (1992) explain that

the culture that shapes values in police forces from these organisations' characteristics, which include a paramilitary structure, internal solidarity, acculturation of new members and a rigid work routine.

Police organisations have a strong cultural identity rooted in a complex set of principles and values that are shared through institutional activities. There are significant barriers to implementing significant and timely changes due to their nature, which is conservative, bureaucratic, corporatist and centralising. They also have aspects in common with military organisations: unity, esprit de corps, solidarity, traditionalism and ritual, among others.

The ritualistic military aesthetics of police corporations encourage other principles that are essential to police activities which aim to preserve public order, such as "respect and compliance with the rules, so that its members are seen as reputable professionals committed to serve and protect the citizens" (Fernandes, 2023, p.149). Polices forces can be mobilised quickly, are in constant readiness, are trained, armed and often interconnected, and obey the principle of prompt obedience. This means that military aesthetics play a relevant role in how the police is used and controlled (Fernandes, 2023).

The internal structure of police organisations already imparts certain values and, consequently, cultural traits, such as a rigid hierarchy, ritualised behaviour, standardised training, formal rules and doctrines (Oliveira Júnior, 2011). Police organisations are influenced by military ethos. Bittner (1970, p. 52) presents a conception of the police as a "quasi-military" institution. Camargo (1997) emphasises military aesthetics and rituals:

military aesthetics should not be confused with war culture; military aesthetics are necessary because they impart the values of discipline and hierarchy; and military aesthetics in police institutions is one of the factors that ensures respect for citizens' rights. (p. 4)

For Monjardet (2002), the core values of police organisations, police work is substantially more complex than any other profession:

the work of an engineer, technician or factory worker can be explained (until proven otherwise) without referring to a personal value system or the collective value system of a given group [...]. Police work cannot be understood at first glance (Monjardet, 2002, p. 162-163).

Skolnick (1994) asserts that police officers build reciprocal relationships of authority with citizens, and that they possess cultural traits that transcend national borders, shaping a global professional identity of what it is to "be a police officer". Wood et al. (2004) found that certain assumptions are disseminated by most police officers, creating a standardised model that is at the root of police identity and that is emulated by other subcultures. According to Oliveira Júnior (2007, p. 103), "there is a shared element in the police experience or activity that fosters a unique way of thinking about their work, their relationship with society and the criminal population". Police values transcend national geographical boundaries, shaping a universal professional identity that can be transposed to any region or civilisation.

2.3. Institutional values

Institutional values guide the day-to-day of organisations and the behaviour of their members at all levels of the hierarchy (Paz & Tamayo, 2004). They are a set of convictions and principles of behaviour; that is, what is believed and practised, and what is at the heart of the organization's culture. They are desirable virtues or positive attributes that one should aim to preserve, acquire and/or encourage. Institutional values are a part of the organisation's identity and help define what it is and how it perceives itself, making it possible to predict how it operates and the behaviour of its members, which is why they are so important for organisational identity (Sousa, 2009). Values and other cultural manifestations, such as rituals and rules, provide a common orientation for all those who share the same corporate environment (Sousa, 2009).

Values are an interdisciplinary topic of study that has been analysed in several works in various fields of knowledge, including philosophy, administration, psychology, sociology and law (Fernandes, 2023). They are expressed in a statement from the organisation's leadership and describe, or should describe, their declared beliefs. This means that there might not be a direct correspondence between what is declared and what is practised (Gonçalves & Campos, 2012). In the case of the Police, doctrine is an important source when elaborating the statement of institutional values.

The AC2ID model of corporate identity explains the gap that can occur between what is real and what is shared. According to Balmer and Greyser (2002), there are five identities in any organisation (AC2ID): Actual, Communicated, Conceived, Ideal and Desired. If there is a manifest, deliberate incompatibility between what is real and what is shared as true, the corporation is dealing with what can be described as a true piece of fiction (Fascioni, 2010).

Other aspects can highlight the importance of institutional values. The first is stakeholder management. According to Freeman and McVea (2001), an organization should look outwards to identify and invest in relationships that make its success possible in the long term and that stakeholders can only cooperate if, despite their differences, they share the same values. For this relationship to be successful, it must be based on common values (Freeman & McVea, 2001). The second aspect is that values orient and guide how strategies are conceived and implemented. The organisation needs to know who it is before it can decide what to do (Stimpert et al., 1998). Tavares (2010) notes that strategy must align with institutional values.

Several authors have identified a typology of values and published studies proposing ways to categorise them. This typology is summarised in table 2. Schwartz (1992) proposed a categorisation based on objectives, with four axes that describe a bipolar relationship in which, at one end, independent thinking and action are encouraged and change is promoted, and, at the other end, obedience and self restriction are cultivated and traditional practices and personal stability are protected. Gondim and Tamayo (1996) proposed a model with four dimensions: cognitive, motivational, hierarchical and functional. Paz and Tamayo (2004) identified eight types of values: achievement, conformity, expertise, employee well-being, tradition, prestige, autonomy and concern for community. Finally, Johann (2013) identified two types of values that are distinguished by their endurance: core ideology and adjacent values.

Table 2 – Types of organisational values

Author/ Categorisation	Type	Description
Schwartz (1992) Objectives	Openness to change	Bipolar relationship between openness to change and the values that facilitate maintaining the status quo
	Conservation	
	Self enhancement	Openness to change versus conservation; self enhancement versus self transcendence
	Self transcendence	
Gondim and Tamayo (1996) Dimensions	Cognitive	Beliefs, principles, convictions, etc.
	Motivational	Goals, targets, challenges, interests and preferences
	Hierarchical	Distinction between what is essential and what is secondary
	Functional	Behaviour-oriented. What is ethical and what is unethical
Paz and Tamayo (2004) Values	Achievement	Values performance/meritocracy
	Compliance	Values respect for rules and good behaviour
	Expertise	Values results
	Employee well-being	Values a good work environment
	Tradition	Values tradition and routine
	Prestige	Values external image
	Autonomy	Values creativity and innovation
	Concern with group	Values justice and fairness
Johann (2013) Endurance	Core ideology	Resistant, strong, authentic, noble and enduring
	Adjacent	Evolve with the environment

Source: adapted from Gondim and Tamayo (1996), Johann (2013), Paz and Tamayo (2004) and Schwartz (1992)

Gondim and Tamayo (1996) divide organisational values into those considered important or as a priority and those that are seen as non essential. Similarly, Johann (2013) divides values into core ideology and adjacent values. Core ideology consists of the strongest, most authentic, noble, enduring and perennial values, which transcend time. They shape the personality of the organisation, have a rich historical and cultural context and are common in centenarian, traditional and conservative institutions such as the Church, militaries and police organisations. They constitute “a stable, immutable layer of identity” (Johann, 2013, p.148).

The values that comprise an organization’s core ideology change very little, even if the environment changes. They must be shared internally because they do not depend on context. Adjacent values are acquired as the organisation evolves and adapts to external changes, allowing it to “reposition itself strategically and culturally in the face of new situations and challenges” (Johann, 2013, p.162).

This study uses the typologies proposed by Gondim and Tamayo (1996) and Johann (2013) to compare and interpret the institutional values identified in police organisations and identify basic and adjacent values.

3. Methodology

This study analyses the organisational culture of police corporations by identifying their institutional values, based on the assumption that police values transcend all national borders and shape an international professional identity of what policing is (Oliveira Júnior, 2007; Skolnick, 1996; Wood et al., 2004). The next section describes the research methods and techniques.

3.1. Methods and techniques

The study used an inductive approach because, as Lakatos and Marconi (2003, p.86) explain, “induction is a mental process in which one infers a general or universal truth from a set of verifiable data, which is not contained in the parts examined separately”. The purpose of inductive arguments is to reach conclusions that are more general than the premises on which they are based. The institutional values identified in the corporations analysed in the study can be generalised to others. This will achieve the general objective and answer the research question. As this is a qualitative exploratory research work that aims to achieve a set of objectives, data were collected through a literature review.

The technique chosen for the study was a comparative analysis of the statements of values of police organisations in 11 countries. When no statements were found, the values were extracted and interpreted from the mission or vision statement. This heterogeneous sample of countries and police corporations allowed the authors of this cross sectional study to outline the international organisational culture of the Police by comparing the institutional values of the police corporations analysed here.

Based on this combination of methods and techniques, the authors proposed a brief analytical framework (figure 2), which they used as a methodological tool to search for a solution to the problem that was formulated and achieve the general objective.

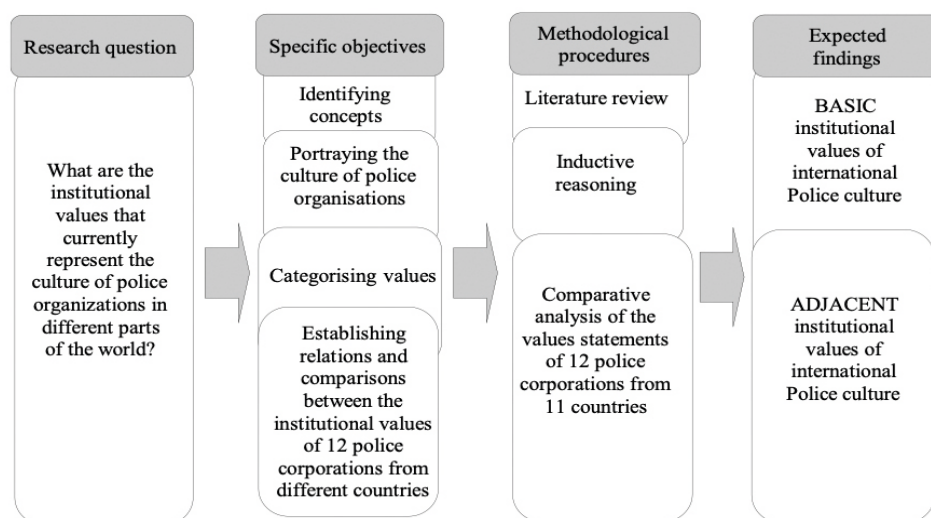


Figure 2 – Analytical framework

A set of criteria was defined to determine which countries and police organisations would be analysed.

3.2. Selection criteria by country

A heterogeneous sample of 11 countries was selected based on the institutional design of their political systems (presidential, parliamentary and semi-presidential) and type of state (unitary, federal and confederate). The other selection criteria were geographical location by continent (North and South America, Europe, Africa and Asia), area (large, medium and small) and civilisation.

Regarding civilisations, Huntington (1996) states that global politics can be interpreted in terms of cultural, ethnic, religious and linguistic differences: Western, Sino-Confucian, Islamic, Hindu, Latin American, Slavic-Orthodox, Japanese, African, Buddhist and insular. The sample included countries from five continents, representing three systems of government, two forms of state, three area sizes and five civilisations (see table below).

Table 3 – Selected countries

Country	Continent	System of Government	Type of State	Area	Civilisation
England	Europe	parliamentary	unitary	medium	Western
Portugal	Europe	semi-presidential	unitary	small	Western
Spain	Europe	parliamentary	unitary	medium	Western
South Africa	Africa	parliamentary	unitary	large	African
United States	North America	presidential	federal	large	Western
Brazil	South America	presidential	federal	large	Latin American
Chile	South America	presidential	unitary	medium	Latin American
Germany	Europe	parliamentary	federal	medium	Western
India	Asia	parliamentary	federal	large	Hindu
Jordan	Asia	parliamentary	unitary	small	Islamic
Nigeria	Africa	presidential	federal	large	Islamic

3.3. Sample selection criteria

Twelve organisations from the selected countries were analysed and characterised according to two variables proposed by Emsley (1999): their nature (civilian or military) and the level of government they answer to (local, state or central). The organisations are the Metropolitan Police, the *Guarda Nacional Republicana*, the *Polícia de Segurança Pública*, the *Guardia Civil*, the South African Police Service, the Los Angeles County Sheriff's Department, the *Polícia Militar de Minas Gerais*, the *Carabineros de Chile*, the *Bayerische Polizei*, the Kerala Police, the Public Security Directorate and the Nigeria Police Force.

The sample is heterogeneous and representative because the organizations are from different regions of the world, include civilian and military institutions, use different models of policing, and operate in countries with different institutional designs and distinct cultures.

Of the selected police corporations, five are military and seven are civilian. Two of them answer to the local government, three are state police and seven answer to the central administration. The table below lists the police organisations analysed here and the selection criteria.

Table 4 – Sample of police corporations

Countries	Police corporations	Typological variables	
		Nature	<i>Subordination</i>
England	Metropolitan Police	civilian	Local
Portugal	<i>Guarda Nacional Republicana</i>	military	Central
	<i>Polícia de Segurança Pública</i>	civilian	central
Spain	<i>Guardia Civil</i>	military	central
South Africa	South African Police Service	civilian	central
United States	Los Angeles County Sheriff's Department	civilian	local
Brazil	<i>Polícia Militar de Minas Gerais</i>	military	state
Chile	<i>Carabineros de Chile</i>	military	central
Germany	<i>Bayerische Polizei</i>	civilian	state
India	Kerala Police	civilian	state
Jordan	Public Security Directorate	military	central
Nigeria	Nigeria Police Force	civilian	central

4. Data and discussion of findings

Twelve police organisations were selected to obtain a heterogeneous, representative sample. These corporations are from different regions of the world, include civilian and military institutions, use different models of policing, and operate in countries with different institutional designs and distinct cultures: the Metropolitan Police, the *Guarda Nacional Republicana*, the *Polícia de Segurança Pública*, the *Guardia Civil*, the South African Police Service, the Los Angeles County Sheriff's Department, the *Polícia Militar de Minas Gerais*, the *Carabineros de Chile*, the *Bayerische Polizei*, the Kerala Police, the Public Security Directorate and the Nigeria Police Force.

The Metropolitan Police was created in 1829. It was responsible for policing most of London, except for the City of London, which is under the jurisdiction of the City of London Police (Fernandes, 2023). This police force is known as the Scotland Yard and, according to Miller (1999), it pioneered crime prevention by using strategies such as visible patrols and full time policing, instead of being a reactive force that only intervened to arrest offenders. The Metropolitan Police, as a civilian force, was a benchmark for police forces in the United States and in the former colonies of the vast British Empire (Mendonça & Dantas, 2016).

The *Guarda Nacional Republicana* (GNR) and the *Polícia de Segurança Pública* (PSP) are the two elements of the Napoleonic (or dualist) model used in Portugal, which combines military and civilian police forces. Both are considered “beat police” with the same mandate: preserving public order. What distinguishes them is their area of operations: the GNR is responsible for cities with smaller populations, rural areas and road traffic, the PSP operates in major urban centres (Fernandes, 2023).

The GNR has territorial jurisdiction over approximately 94% of the country and 54% Portuguese citizens (GNR, 2020; Silva, 2013). The PSP operates in most urban areas and processes about 52% of general crime and approximately 70% of violent crime in Portugal (Poiares, 2018).

The *Guardia Civil* (Civil Guard) and the *Cuerpo Nacional de Policía* (National Police Corps) are the backbone of Spain’s dual system, which is based on the same principles as the Portuguese model. The *Guardia Civil* is a military force that operates in smaller towns and rural areas and acts as road traffic police. The *Cuerpo Nacional de Policía*, a civilian force, has jurisdiction in major cities. The *Guardia Civil* operates in all regions of the country. It has over 2,000 stations and a staff of about 80,000 police officers. Its mission is to protect people from criminal acts, enforce the law and bring offenders to justice, guarantee that people have the freedom to exercise their rights and protect the public (Guardia Civil, n.d.).

The South African Police Service (SAPS) was established in 1995 to replace the South African Police Force (SAP) after the country’s racial segregation regime (apartheid) was abolished. It is responsible for preserving order in South Africa. After the police reforms which sought to change the negative image of the police during the apartheid (Carrera Neto, 2020), its organization, which had been military until then, was restructured and the resulting model was very similar to the British. In 2017, it was militarised again. The SAPS is a national force organised into nine provincial services, comprising more than 1,100 police agencies, with provincial commanders (Provincial Commissioners) who answer to the National Commissioner (Carreira Neto, 2020).

The Los Angeles County Sheriff’s Department (LASD) is responsible for policing in Los Angeles County. It has territorial jurisdiction in half of the county’s 88 cities (the other half is served by local police departments). In addition to policing and investigating crimes, it is also responsible for guarding the courthouse, maintaining correctional facilities, escorting inmates and controlling road traffic in the Los Angeles metropolitan area (Carrera Neto, 2020). The US model is highly fragmented. It is subdivided into municipalities, counties, states and the federal government (Dantas & Mendonça, 2022; Sanderson, 2016). However, local police, county police and sheriffs function as crime prevention forces – that is, as a “beat police” – and are the backbone of the police system in the US.

The *Polícia Militar de Minas Gerais* (PMMG) is one of the 27 public order police forces in the country. During the republican period, Brazil developed a police structure based on a federated model, with 27 units and two police corporations per unit, a “beat police” and an investigative police (the Military Police and the Civil Police), which means it is a dual model divided into preventive and investigative police, rather than a “full cycle” model. The Brazilian

Constitution provides for three other institutions that answer to the federal government: the *Polícia Federal* (Federal Police), the *Polícia Rodoviária Federal* (Federal Highway Police) and the *Polícia Ferroviária Federal* (Federal Railway Police). The new *Polícia Penal* (Criminal Police) was established in 2019 and operates at both levels of government (state and federal).

The PMMG was the police corporation selected in Brazil for three reasons: it is a benchmark for other military police forces in terms of its focus on management and organisational development (its organisational structure includes an office of strategy management and a project management office) (Silva, 2017); it has a statement of values since 2004, which has provided the authors of this study useful historical information; in 2020, it was commended by the *Tribunal de Contas da União* (Federal Court of Accounts) as a “benchmark in developing an Evaluation Model for Public Security Governance and Management” (Fernandes, 2023).

Chile’s *Carabineros* operate as a “beat police” and are the country’s most important and most traditional police force. They were established in 1927 as a result of the militarisation of police activity over the last two centuries and of a modernisation strategy which aimed to implement more controlled and disciplined policing in emergency situations (Rocha, 2014). The Chilean model includes an investigative police (PDI) and crime prevention police (the *Carabineros*). The *Carabineros* answer to the central government. They are a military institution like the Armed Forces and they are responsible for maintaining public order in the country (Fernandes, 2023).

The *Bayerische Polizei* (Bavarian Police) is one of the 16 “beat police” forces that operate in each of the country’s states. The German Constitution is the country’s *Grundgesetz* (Basic Law), which defines the federation as a form of State and sets out the agencies responsible for preserving public order in each of the 16 federal units (Carrera Neto, 2020). According to Carrera Neto (2020), in addition to the police forces of each state, called *Landespolizei*, the country’s police system has three federal police forces: the *Bundespolizei* (Federal Police), the *Bundeskriminalamt* (Federal Investigation Police) and the *Polizei des Deutschen Bundestags* (Police of the German Parliament). The *Bayerische Polizei* is the *Landespolizei*. It serves 13 million people and operates in Germany’s largest state – Bavaria. Because the German state is a federation, each police corporation has specific rules, procedures, protocols, etc. (Carrera Neto, 2020).

The *Kerala Police* is one of the 28 state police forces in the federal model used in India. Like the Brazilian and German models, each state of the Republic of India has its own “street police” headed by a Director General of the Police who reports to each state’s Ministry of Home Affairs. The exception is the Delhi Police, which answers to the central government. The *Kerala Police* is the state police of the state of Kerala, one of the top ranking states in terms of maintenance of law and order. It has the reputation for being a benchmark in public safety and has inspired reforms in other police forces in India (Kerala Police, 2020).

The Public Security Directorate is the only public order police force in Jordan. It is a military force that operates in the whole country. Jordan is a country in Asia located at the crossroads of the continents of Africa, Asia and Europe. Its system of government is a unitary constitutional monarchy. The last reform of the country’s police system was in 2019, when

all the security forces were merged to create the Public Security Directorate (Public Security Directorate, n.d.).

The Nigeria Police Force is the only “beat police” in the country. It is a civilian force that answers to the central government and is commanded by an Inspector General of Police appointed by the President of the Republic. The corporation is headed by a Police Commissioner for each of the federal states (Nigeria Police Force, 2023). Nigeria is a federal republic with 36 federal states. It is located in West Africa and it has the largest population on the continent. It is considered a regional economic power.

After selecting the countries and police forces, the next step was to identify the institutional values of each force that would be analysed and compared. The table below contains the statement of values of each corporation.

Table 5 – Statement of values by police force

Police corporation	Declaration of values
Metropolitan Police	Professionalism, integrity, courage and compassion
<i>Guarda Nacional Republicana</i>	Knowledge and innovation, unity, competence, loyalty, discipline and transparency
<i>Polícia de Segurança Pública</i>	Rigour, discipline and a sense of duty; humanism; uncompromising defence of legality and objectivity; rejection of any form of extremism or discrimination; commitment to the mission
<i>Guardia Civil</i>	Honour, service, discipline, loyalty and companionship
South African Police Service	Impartiality, courtesy, honesty, respect, transparency and responsibility
Los Angeles County Sheriff's Department	Respect for the dignity of all people; integrity to do right and fight wrongs; wisdom to apply common sense; fairness; and courage to stand against racism, sexism, anti-Semitism, homophobia and bigotry in all its forms
<i>Polícia Militar de Minas Gerais</i>	Honour, professionalism, hierarchy, military discipline and patriotism and selflessness
<i>Carabineros de Chile</i>	Dedication to service, patriotism, honour, permanent police, sacrifice, fairness, loyalty, versatility, tradition, esprit de corps and comradeship
(*) Bayerische Polizei	Commitment, honour, humaneness, sacrifice, respect, loyalty, impartiality, comradeship, professionalism, quality and respect for human rights
(*) Kerala Police	Commitment, excellence, transparency, fairness, respect and respect for human rights
Public Security Directorate	Human rights and the rule of law; loyalty and belonging; integrity and transparency; participatory and inclusive security; professionalism and training; institutionalism; sacrifice and bravery; humaneness and public protection; excellence and creativity
(*) Nigeria Police Force	Professionalism, competence, cooperation, quality, proximity, respect

(*) As these corporations have not published a statement of values, the values listed above were extracted from the mission or vision statement.

Source: adapted from *Carabineros de Chile* (2024), *Die Bayerische Polizei* (n.d.), Fernandéz (2017), *Guarda Nacional Republicana* (2020), Kerala Police (2020), Los Angeles County Sheriff's Department (2021), Metropolitan Police (2020), Nigeria Police Force (2023), *Polícia Militar de Minas Gerais* (2023), *Polícia de Segurança Pública* (2023), Public Security Directorate (n.d.) and South African Police Service (2020).

As we can see, the way in which values are described is different for each corporation. While some listed each institutional value, others expressed them as sentences. On the other hand, some statements contained similar values, which meant that the data had to be standardised. Therefore, to facilitate their interpretation and analysis, the authors made two adjustments: extracting the value or values from each sentence and standardising values with similar meaning (see the table below).

Table 6 – Standardised values

Similar values	Standardised values
• Sense of duty • Commitment to the mission • Dedication to service	Commitment
• Rejection of any form of extremism or discrimination • Respect for the dignity of all people • Human rights and the rule of law • Courage to stand against racism, sexism, anti-Semitism, homophobia and bigotry in all its forms	Respect for human rights
• Sacrifice • Selflessness	Sacrifice
• Quality • Excellence	Quality
• Humanity • Humanism • Humaneness • Compassion	Humanity
• Impartiality • Objectivity	Impartiality
• Courage to stand against racism, sexism, anti-Semitism, homophobia and bigotry in all its forms • Courage • Bravery	Courage
• Participation • Participatory security	Participation
• Permanent police	Constancy
• Innovation • Creativity	Innovation
• Fairness • Isonomy	Fairness

After making the required adjustments, 36 values were identified in the 12 corporations, namely: “professionalism”, “integrity”, “courage”, “humanity”, “knowledge”, “innovation”, “unity”, “competence”, “loyalty”, “transparency”, “respect for human rights”, “commitment”, “legality”, “impartiality”, “honour”, “comradery”, “courtesy”, “honesty”, “respect”, “responsibility”, “wisdom”, “justice”, “hierarchy”, “discipline”, “patriotism”, “constancy”, “sacrifice”, “versatility”, “tradition”, “esprit de corps”, “fairness”, “belonging”, “participation”, “quality”, “proximity” and “cooperation”. Fourteen values were mentioned by three or more organisations. The table below contains these values, categorised as basic and adjacent.

Table 7 – Most mentioned values in police corporations

Institutional values	Number of corporations	Category	
		Basic	Adjacent
Commitment	5		
Loyalty	5		
Professionalism	5		
Respect for human rights	5		
Honour	4		
Respect	4		
Discipline	4		
Sacrifice	4		
Quality	4		
Transparency	4		
Humanity	4		
Impartiality	4		
Courage	3		
Fairness	3		

These values are mentioned by five corporations: “commitment”, “loyalty”, “professionalism” and “respect for human rights”. Eight values are mentioned by four corporations: “honour”, “respect”, “discipline”, “sacrifice”, “quality”, “transparency”, “humanity” and “impartiality”. Two values are mentioned by three corporations: “courage” and “fairness”. While “hierarchy” was mentioned by only one organisation, “discipline” is enshrined in police culture, doctrine and legality (Fernandes, 2023). The pillars of police organisations, both civilian and military, are “hierarchy” and “discipline”, which can be interpreted as obedience to the rules of professional conduct and to one’s hierarchical superior (Sousa, 2009).

Regarding the categorisation of institutional values as core ideology/basic values and adjacent values (Johann, 2013), the values that shape the core ideology of the police in the police organisations analysed here are: “commitment”, “loyalty”, “honour”, “respect”, “discipline/hierarchy”, “sacrifice” and “courage”. These values are similar to the ones mentioned by the Brazilian military police: “discipline”, “hierarchy”, “respect”, “honour” and “courage” (Fernandes, 2023). The section below will briefly address each of these basic values.

One of the most important is “Commitment”, which is also described as “sense of duty”, “commitment to the mission” and “dedication to service”. For Reiner (2004, p. 136-137), the “central characteristic of police culture is a sense of mission. It is the feeling that policing is not just a job, but a way of life with a useful purpose [...]”. The importance of this “sense of mission” is highlighted in a survey of military police officers stationed in the state capital of Minas Gerais, in which 87% of respondents stated that their profession is more important to society than other professions, 61% said that only those who are dedicated to service should be military police officers, and 70% agree that there are protocols and techniques that are only known to police officers (Oliveira Júnior, 2011).

“Loyalty” is linked to police ethos, which emphasises the importance of loyalty to family, citizens, superiors and subordinates, and, above all, to the institution (Sousa, 2009). This value should be expressed not only through behaviours, but through a mindset that includes cognitive and affective elements that are considered essential for the relationships within the police organisation and between its members (Polícia Militar de Minas Gerais, 2020). “Honour” should guide the conduct of police officers, even when they are not on duty. The *Guardia Civil* states that “honour”, one of the institution’s values, is the moral quality that allows a person to fulfil their duty to others and to oneself, and that it should inspire all actions of every member of the community (Silvelo, 2015).

“Respect”, that is, compliance with the rules, is a basic value for all those who have taken on the duty of preserving public order, which shows a commitment to serve and protect citizens (Fernandes, 2017). Most corporations mentioned “respect”, which shows that this value is essential to police culture and to the organization’s mission. It can be defined as the duty to those who serve in the corporation and those who are served – citizens and society –, which requires professional expertise and the ability to respect and guarantee people’s fundamental rights (Military Police of Minas Gerais, 2020).

According to Camargo (1997, p. 4), the values “discipline” and “hierarchy” are “fundamental for public administration; (...) they are necessary to command the troops”. Bretas (1997) asserts that modern police forces are benchmark organisations inasmuch as they are bureaucratic structures that must be efficient and respect certain principles. When they became professional forces, procedures, techniques, discipline and a hierarchy had to be created to facilitate their mission of maintaining order and fighting crime (Oliveira Júnior, 2011).

The value “sacrifice” is a consequence of “commitment”, as personal sacrifice is required to accomplish the mission of preserving public order and protecting people and property. The “war on crime” conception also highlights “commitment” and “sacrifice” (Oliveira Júnior, 2011). As for “courage”, bravery, fearlessness, boldness and other similar adjectives, these qualities should guide the actions of police officers, even at the cost of their own lives (Sousa, 2009). The PMMG defines “courage” as bravery and the fortitude, strength or moral energy that enables a person to face danger (Fernandes, 2023).

The other values identified in this study are adjacent values which are derived from socio cultural changes and global scenarios, such as the public demand for quality services; the empowerment of social actors due to improvements in education, access to information and digital inclusion; increased social participation and mobilisation to demand quality public services; the increasingly complex demands for public policies; and the growing importance of social and cultural diversity on the political agenda and in organisations (Fernandes, 2023).

The current legislation has also introduced further restrictions and oversight of police activity. As a result, a new concept of policing emerged based on the principles of human dignity, legality, justice, freedom and security (Afonso, 2018). These principles, which stem from political and social changes, are driving (and will continue to drive) cultural changes in the police from which other values will emerge, such as those identified in this study: “professionalism”,

“respect for human rights”, “quality”, “transparency”, “humanity”, “impartiality” and “fairness”.

The research question that guided the study – What are the institutional values that currently represent the culture of police organisations in different parts of the world – was answered by identifying a set of 14 values (seven basic values and seven adjacent values).

5. Conclusion

The authors of this study analysed culture in police corporations, specifically, the institutional values that shape it. The study of values in organisational culture is transdisciplinary and has been addressed in several fields of study. In this study, it is approached from the perspective of Management and Police Science, as the institutional values of the Police reveal how it thinks and acts. In other words, its planning, organization, orientation and command, which sustain its strategy. The aim was to outline the international culture of the police, based on each of the institutional values of the organisations analysed here.

The study topic is the institutional values of “beat police” forces, that is, the organisations that conduct visible activities to preserve public order. The study used an exploratory qualitative approach based on a literature review, logical reasoning and a comparative analysis of 12 police corporations from 11 countries, which were selected according to defined criteria to obtain a diverse, representative sample of countries and police forces. The criteria were: the model of police system; area and geographical location; institutional design and civilisation.

The study identified: i) a typology of organisational values categorised according to objectives, dimensions, values and endurance; ii) the existence of a culture with basic and adjacent organisational values – basic values are common characteristics that are almost universal to police organisations (they are stable, typical, traditional and conservative), whereas adjacent values are not integral to the organization’s core ideology, but are equally important because they respond to changes and current and future scenarios; iii) several common attributes in the institution’s values, despite the different types of police corporations that were analysed.

The study’s findings accomplish the general objective and answer the research question that guided the study – What are the institutional values that currently represent the culture of police organisations in different parts of the world? The institutional values that shape the organisational of police forces are: “commitment”, “loyalty”, “honour”, “respect”, “discipline/hierarchy”, “sacrifice” and “courage”. Other values that are becoming equally important, even if they are not a fundamental part of police culture, are “professionalism”, “respect for human rights”, “quality”, “transparency”, “humanity”, “impartiality” and “fairness”.

Finally, the police corporations selected as the study sample placed a high value on “respect”, especially in relation to human rights, highlighting the growing importance of an adjacent value that will become an essential part of police culture in the long term, given the global shift in attitudes towards social and cultural diversity.

The study helps to bridge a gap in academic-scientific research, given the scarcity of studies on the institutional values that currently characterise police culture in different parts of the world. One limitation was the relatively small sample, which can be problematic, as

it can lead to distortions. Further studies should be conducted with a larger sample that includes the continents and civilisations that were not included in the sample, as this will allow for the identification of other institutional values.

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A INFLUÊNCIA DA SEGURANÇA HUMANA NA SEGURANÇA DOS ESPAÇOS MARÍTIMOS: O CASO DO ATLÂNTICO SUL

THE INFLUENCE OF HUMAN SECURITY ON THE SECURITY OF MARITIME SPACES: THE CASE OF THE SOUTH ATLANTIC

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Resumo

Afirmou Kenneth Waltz, no final da década de 1970, que, atenta a ordem anárquica vigente, a segurança era o fim mais alto dos Estados e estes apenas poderiam prosseguir outras metas depois de assegurada a sua sobrevivência.

Todavia, no final da Guerra Fria verificou-se uma abertura no modo como a segurança era interpretada. Barry Buzan, Ole Wæver e Jaap de Wilde contam-se entre os principais teóricos que questionaram a primazia do Estado na conceptualização da segurança. E o facto é que o seu alargamento a campos além do político-militar levou a que conceitos como segurança humana e segurança marítima tivessem emergido no léxico das relações internacionais.

Seguindo uma estratégia de investigação qualitativa e um raciocínio indutivo, este artigo analisa, a partir de um estudo de caso, a pesca ilegal, não declarada e não regulamentada no Atlântico Sul, uma vez que o seu crescimento ao longo deste século a guindou à condição de uma das mais relevantes ameaças à segurança e bem-estar das populações daquela região. As conclusões evidenciam que a crescente escassez de recursos haliêuticos pode colocar em causa a segurança humana das populações, levando-as a enveredar por atividades ilícitas que podem comprometer a segurança marítima do Atlântico Sul.

Palavras-chave: Atlântico Sul; recursos haliêuticos; segurança humana; segurança marítima

Abstract

Kenneth Waltz claimed at the end of the 1970s that, given the anarchic order in force, security was the ultimate goal of states and that they could only pursue other targets when their survival was assured.

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However, at the end of the Cold War, there was an opening up in the way security was interpreted. Barry Buzan, Ole Wæver and Jaap de Wilde were among the leading theorists who questioned the primacy of the state in conceptualising security. And the fact is that its extension to fields beyond the military-political has led to concepts such as human security and maritime security emerging in the lexicon of international relations.

Following a qualitative research strategy and inductive reasoning, this article analyses illegal, unreported and unregulated fishing in the South Atlantic on the basis of a case study, since its growth over the last century has elevated it to the status of one of the most significant threats to the security and well-being of the region's populations. The conclusions show that the growing scarcity of fish stocks can undermine the human security of populations, leading them to engage in illegal activities that can compromise maritime security in the South Atlantic.

Keywords: *South Atlantic; fisheries resources; human security; maritime security*

1. Introdução

O pensamento tradicional dominante sobre segurança na segunda metade do século XX foi sobretudo associado ao realismo – que sublinha os condicionalismos impostos à política pelo egoísmo humano e a ausência de um governo internacional, o que exige a primazia do poder e da segurança em toda a vida política (Donnelly, 2005, p. 30) –, e caracterizou-se por três elementos essenciais: enfatizou as ameaças militares; foi orientado para o *status quo*; e centrou-se nos Estados (Booth, 2007, p. 203).

Barry Buzan, que embora tivesse uma origem próxima do neorrealismo, foi um dos principais rostos da Escola de Copenhaga (cujas raízes se fundam no construtivismo) (Huysmans, 1998, p. 483). Considerou, em 1983, que o conceito de segurança era muito mais poderoso e útil do que o seu *status* sugeria e merecia, por conseguinte, ser elevado a uma posição hierárquica semelhante ao poder, que tinha sido dominante até então (Buzan, 1983, p. 2). E o início da década de 1990 trouxe apenas, de facto, a ideia de um novo conceito de segurança, mais alargado, saindo do seu foco tradicional muito centrado nos Estados e no poder militar, para incluir a segurança das pessoas e do próprio planeta (Rothschild, 2007, p. 2). Foram várias as personalidades (e as organizações) que nos primeiros anos daquela década abordaram este tema. O presidente Bill Clinton, por exemplo, num discurso proferido na Assembleia-geral das Nações Unidas, em 27 de setembro de 1993, referiu-se a um novo entendimento do significado e natureza da segurança nacional e ao papel a ser desempenhado nesse domínio pelos indivíduos e pelos Estados (Clinton, 1993). Também a Comissão sobre a Governança Global – criada em 1992 para sugerir novas formas de cooperação para a promoção de uma agenda de segurança global – veio reconhecer, em 1995, que essa segurança se estendia além da proteção das fronteiras e dos interesses exclusivos dos Estados e devia incluir a proteção das pessoas. Não excluía as ameaças militares da agenda de segurança, mas propunha, em alternativa, uma definição mais alargada das ameaças à luz das preocupações humanitárias do pós-Guerra Fria (Commission on Global Governance, 1995, p. 3). Ainda neste âmbito, releva o

facto de o Programa das Nações Unidas para o Desenvolvimento (UNDP)¹ ter adotado como tema principal da Agenda de Desenvolvimento Humano, de 1994, a transição da segurança nuclear para a segurança humana. O conceito de segurança humana foi definido, em sentido lato, como a segurança contra ameaças crónicas – como a fome, a doença e a repressão – e a proteção contra perturbações súbitas e prejudiciais (UNDP, 1994, p. 3).

Barry Buzan, Ole Wæver e Jaap de Wilde apresentaram, alguns anos depois, uma nova estrutura de análise dos estudos de segurança que se propunha examinar o carácter das dinâmicas de segurança em cinco setores distintos: político, militar, societal, económico e ambiental. Esta estrutura rejeitava de forma clara a visão tradicional de restringir a segurança a um único setor (que existiu durante o período da Guerra Fria), defendendo antes que a segurança era um caso particular da política aplicável a um vasto conjunto de questões. Como consequência, passaram a existir duas visões distintas sobre os estudos de segurança: a nova, personificada pela corrente favorável ao alargamento do conceito a outros campos; e a tradicionalista, que mantinha uma linha eminentemente militar e centrada no Estado (Buzan, Wæver, & Wilde, 1998, pp. 1-2).

Edward Kolodziej defendeu, nos primeiros anos do presente século, a ideia de que a segurança era um conceito complexo e contestado – fortemente carregado de emoções e valores profundamente enraizados – e considerou que a maioria das pessoas facilmente concordaria que um problema de segurança surgiria quando alguém – um indivíduo, um grupo ou mesmo um Estado – lograsse ameaçar a vida, a integridade física ou os meios de subsistência de outrem. Nessas circunstâncias, alegou que o seu significado poderia ser alargado a valores e interesses muito diversificados – desde os danos ambientais causados pelo aquecimento global até à luta pela subsistência de milhões de pessoas no mundo em desenvolvimento, passando pela proteção dos direitos humanos contra ameaças diversas, incluindo a tortura e o genocídio (Kolodziej, 2005, p. 1).

Pode, pois, afirmar-se que o conceito de segurança ganhou preponderância significativa no pós-Guerra Fria e logrou apresentar significados distintos. A segurança humana, por exemplo, passou desde então a articular uma agenda muito ampla, assumindo-se como ponto de encontro para uma diversidade de atores que tem procurado aumentar o apoio a questões relacionadas com o desenvolvimento (económico, social e humano) e políticas externas humanitárias (Buzan & Hansen, 2009, p. 205). A segurança marítima é mais um termo recente que tem vindo a desenvolver-se no edifício conceptual das relações internacionais (RI), sobretudo desde o início do século XXI com a intensificação do receio provocado pelo terrorismo marítimo e com o recrudescimento da pirataria marítima, em particular a somali (Bueger & Edmunds, 2017, p. 1293). Remete para os novos desafios no domínio marítimo e para a forma como devem ser abordadas as questões que lhe estão associadas (Germond, 2015, p. 138).

O objeto do presente estudo centra-se na segurança do domínio marítimo. Pretende-se analisar, em concreto, a influência da insegurança humana na segurança dos espaços

¹ Acrónimo que significa *United Nations Development Programme*.

marítimos, focando uma região que tem vindo a ganhar protagonismo ao longo do presente século, em virtude do crescimento significativo das ameaças aí existentes – o Atlântico Sul² – entre as quais, a pesca ilegal, não regulamentada e não declarada (IUU)³.

Definiu-se, assim, a seguinte pergunta de partida que norteou a investigação desenvolvida: de que forma a insegurança humana das populações ribeirinhas do Atlântico Sul, provocada pela pesca IUU, influencia a segurança marítima da região?

Argumenta-se que, se a segurança das pessoas (sobretudo pescadores) que utilizam o mar de forma lícita no Atlântico Sul for colocada em causa devido à pesca IUU, a segurança marítima da região será francamente afetada por falta de opções válidas de subsistência daquelas populações, levando a que muitas delas possam vir a optar por alternativas ligadas ao crime organizado transnacional (como é, por exemplo, o caso da pirataria e do assalto armado no mar contra navios).

A relevância deste estudo está relacionada com a análise do nexo de causalidade entre segurança humana e segurança marítima (dois conceitos emergentes no léxico das RI no pós-Guerra Fria), numa determinada região (o Atlântico Sul), atenta uma ameaça específica (a pesca IUU). Considera-se, outrossim, que este artigo contribui para o conhecimento que existe sobre a relação entre aqueles dois conceitos e sobre a própria conceptualização da segurança marítima – uma das mais recentes palavras-chave das RI no entender de alguns teóricos de relevo neste domínio (como é o caso de Christian Bueger) e que, por isso, ainda não está suficientemente solidificado.

Este artigo é composto por cinco capítulos. A presente introdução constitui o primeiro capítulo. O segundo capítulo consiste no enquadramento teórico e conceptual. O terceiro capítulo aborda a metodologia seguida na investigação. O quarto capítulo centra-se nos resultados alcançados. O quinto e último capítulo apresenta as conclusões do estudo, focando, em particular, o facto de a pesca IUU se assumir como ameaça inequívoca à segurança humana das populações que no Atlântico Sul se dedicam à captura lícita de recursos haliêuticos e que, como consequência, pode colocar em causa a segurança marítima de toda a região.

2. Enquadramento teórico e conceptual

Este capítulo aborda o quadro teórico da investigação, focando os conceitos estruturantes do estudo: a segurança humana; a segurança marítima; e a pesca IUU (uma das principais ameaças à segurança do Atlântico Sul, na atualidade).

² Que neste artigo se considera ser a região marítima delimitada a Norte pelo paralelo 16° N, a Sul pelo Continente Antártico, a Leste pelo litoral africano e a Oeste pela América do Sul (Marinha do Brasil, 2020, p. 18) e tem como característica ser banhada por “duas grandes esferas da região austral do sistema internacional: a África e a América do Sul” (Marins et al., 2020, p.1), que serão analisadas na presente investigação.

³ Acrónimo que significa ilegal, *unreported and unregulated*.

2.1. Segurança humana

O termo segurança humana, por ser relativamente recente no quadro das RI, permite interpretações diversas. Os governos canadiano e norueguês, por exemplo, associaram-no aos valores progressistas mais proeminentes da década de 1990: direitos humanos, direito internacional humanitário e desenvolvimento socioeconómico baseado na equidade (Suhrke, 2007, p. 125). E o facto é que (como mostram os parágrafos seguintes) estes valores têm vindo a estar muito ligados à segurança humana desde então.

A transição ocorrida no sistema internacional no pós-Guerra Fria trouxe apensos numerosos conflitos locais e regionais – que Mary Kaldor referiu serem “novas guerras” que “envolviam redes de atores estatais e não estatais” e nas quais “a maior parte da violência era dirigida contra civis”, por oposição às “velhas guerras” que “envolviam Estados” e em que “a batalha era o encontro decisivo” (Kaldor, 2012, p. vi) – pelo que a segurança humana, alinhada com os princípios do direito internacional humanitário (um dos valores supra elencados), propunha-se “civilizar a guerra e ajudar as suas vítimas” – salvando vidas e reduzindo o sofrimento das pessoas durante os conflitos armados (2012, p. 128).

Há, no entanto, um outro ponto de partida para explorar o núcleo da segurança humana: o desenvolvimento humano. O relatório do UNDP de 1994 – referido na introdução – examina precisamente a segurança humana em relação ao desenvolvimento humano. A segurança humana foi apresentada, naquele relatório, simultaneamente como um estado final a atingir – segurança contra ameaças crónicas como a fome, a doença e a repressão – e como um processo – em termos de proteção contra perturbações súbitas e prejudiciais nos padrões da vida quotidiana (Suhrke, 2007, p. 129). Como estado final, o termo foi subdividido em sectores como o emprego, a saúde, a educação e o ambiente. A segurança humana era essencial para o desenvolvimento humano, já que sem um mínimo de estabilidade e segurança na vida quotidiana não poderia haver desenvolvimento. Mas o inverso também era verdadeiro, isto é, o desenvolvimento a longo prazo melhorava a vida social e económica, produzindo, por conseguinte, mais segurança humana, concluiu o relatório do UNDP. Neste raciocínio “não há verdadeiramente diferenças entre desenvolvimento humano e segurança humana, ou entre o processo e o estado final [a atingir]” (2007, p. 129). Refletindo sobre esta relação, Astri Suhrke (2007, p. 130) considerou, porém, que garantir a segurança humana significava, amiúde, tomar medidas preventivas imediatas que permitissem a sua prossecução. Já o desenvolvimento humano era, em oposição, um processo de longo prazo, destinado a garantir as condições necessárias para o bem-estar das pessoas.

Mas que razões podem levar a que tenha de ser garantida a proteção dos mais vulneráveis? Para Robert Goodin, a lógica reside na nossa própria responsabilidade pelo infortúnio dos outros (os “mais vulneráveis”). Fez, a propósito, uma distinção entre deveres positivos e negativos. Os deveres positivos estão relacionados com iniciativas tomadas para produzir algo benéfico. Já os deveres negativos significam não interferência, abstendo-se de provocar danos (Goodin, 1985, p. 18). Os “mais vulneráveis” são pessoas expostas a ameaças físicas diretas à sua vida ou à privação do acesso aos recursos necessários para a sua sobrevivência.

São, em qualquer caso, indiretamente identificados pelos direitos humanos, pelo direito internacional humanitário e pelo direito internacional dos refugiados. Mas são, de igual modo, indivíduos colocados em situações delicadas por razões de pobreza extrema ou catástrofes naturais. Isto permite identificar três categorias de pessoas extremamente vulneráveis: as vítimas de guerras e de conflitos internos; as que vivem perto do nível de subsistência e que, portanto, estão estruturalmente posicionadas no limiar da calamidade socioeconómica; e as vítimas de catástrofes naturais (Suhrke, 2007, p. 131).

No final do século XX, Paul Heinbecker (1999, p. 4) abordou, de igual modo, o conceito de segurança humana, afirmando que “os seus componentes não eram propriamente novos”. Referiu, a propósito, que “a vitimização e impunidade” eram intemporais e que “as doenças infecciosas eram tão antigas como a peste”. Sublinhou, outrossim, que “as guerras civis datavam, pelo menos, do Tratado de Vestefália” e considerou até “o crime, a droga e o terrorismo [como] desafios contemporâneos de fenómenos antigos”. Mesmo a “depredação ambiental”, sendo um problema bem mais recente, já existia há algumas gerações. O que para si era verdadeiramente novo estava relacionado com o surgimento do fenómeno da globalização, que levou a que a segurança humana tenha assumido maior preponderância, tornando-se muito mais evidente e exigente aos olhos de todos. Considerou Heinbecker, por fim, que também a letalidade da guerra convencional e o facto de a grande maioria das guerras serem agora intraestatais eram fatores novos, sendo que “noventa por cento das vítimas eram civis, predominantemente mulheres e crianças” (1999, p. 4).

O foco da presente investigação é a segurança e bem-estar das populações ribeirinhas do Atlântico Sul – que, seguindo o pensamento de Goodin, se constituem como os “mais vulneráveis” –, uma vez que podem ver-se privadas do acesso a recursos (haliêuticos) necessários para a sua sobrevivência, em função da pesca IUU.

2.2. Segurança marítima

Assumindo-se como mais um produto do pós-Guerra Fria, desde o final da década de 1990, a segurança marítima tem vindo a ser essencialmente utilizada para descrever medidas preventivas estabelecidas para responder a atividades ilegais no mar (ou a partir do mar). Foi, porém, o terrorismo marítimo (que, embora já existisse, se tornou mais evidente após os atentados perpetrados nos Estados Unidos da América, em 11 de setembro de 2001) e, sobretudo, a pirataria – especialmente depois de 2007, com a ascensão quase exponencial do fenómeno na Somália – que atraíram a atenção da imprensa mundial e das opiniões públicas internacionais sobre a (in)segurança marítima (Bueger & Edmunds, 2017, p. 1293).

Desde então, o termo tem vindo a ganhar significativo destaque no meio académico. A título de exemplo, Christian Bueger (2015, p. 160), um dos teóricos contemporâneos que mais tem refletido sobre a segurança no domínio marítimo, apresentou diversos quadros de análise do conceito, variando entre a “perspetiva semiótica” (que lida com os diferentes significados do termo, explorando as relações entre a segurança marítima e outros conceitos), a “perspetiva da securitização” (que fornece os meios para melhor se entender de que modo as diferentes ameaças são incluídas na segurança marítima), ou a “teoria das práticas de

segurança” (que visa a compreensão das ações empreendidas em matéria de segurança marítima). Focando a análise na perspectiva semiótica – a que mais releva para o objeto de estudo definido –, Bueger edificou uma matriz na qual definiu diferentes dimensões (ambiente marinho, desenvolvimento económico, segurança nacional e segurança humana) e conceitos (segurança marinha, *seapower*⁴, economia azul e resiliência), e elencou diversos riscos e ameaças⁵, afirmando que a segurança marítima podia ser interpretada pelas relações que era possível estabelecer entre eles. Uma das ameaças elencadas por Bueger é precisamente a pesca IUU (2015, p. 161).

Um outro proeminente teórico do poder marítimo da atualidade, Geoffrey Till (2009), apresentou uma perspectiva de análise da segurança marítima diferente, centrando-se, também ele, nas diferentes ameaças que pendem sobre ela, mas optando por focar-se no modelo que melhor poderá levar, no seu entender, ao seu controlo: a edificação de uma boa ordem no mar (nos espaços onde existem tais ameaças), envolvendo diferentes atores, sobretudo Estados (com o apoio de organizações regionais).

Em todo o caso, a segurança marítima lida com atividades humanas (ilegais e disruptivas) no domínio marítimo. Os Estados sofrem impactos diferentes relativamente às ameaças à segurança marítima, que variam em função da sua localização geográfica. Mas o envolvimento dos Estados na garantia da segurança dos oceanos depende, outrossim, de fatores além dos geográficos, como, por exemplo, as capacidades que possuem e a vontade em combater as ameaças existentes no ambiente marítimo em cada momento (Germond, 2015, p. 138).

Importa referir, de igual modo, que, atenta a natureza global do domínio marítimo e o carácter transnacional de muitas das ameaças à sua segurança, há Estados que, ainda que não tenham sido diretamente atingidos por elas, têm vindo a contribuir para os esforços comuns para a sua contenção, baseados no pressuposto de que podem vir a afetá-los mais tarde. E o facto é que expandir a zona de controlo de regiões marítimas para lá dos limites externos de muitos Estados (sobretudo dos mais poderosos) tem sido uma prática recorrente ao longo de praticamente todo o século XXI, configurando aquilo que Basil Germond (2015, p. 139) convencionou apelidar de “expansão territorial pós-moderna”. Neste sentido, garantir a liberdade de navegação e a segurança dos *global commons* – bens comuns da humanidade –, situados nos espaços marítimos além da soberania e jurisdição dos Estados, isto é, no alto mar – para lá das 200 milhas marítimas⁶ –, pode, por exemplo, legitimar a projeção de forças navais muito para lá das fronteiras tradicionais dos Estados. O controlo de áreas marítimas distantes apresenta-se, por conseguinte, vital para garantir a segurança das fronteiras marítimas e do próprio território emerso dos Estados (Germond, 2015, p. 139).

⁴ Que pode significar poder militar no mar em português.

⁵ Os dois termos diferem em função da intenção associada a cada um: a ameaça pressupõe a existência de uma intenção na prática de determinadas ações ilícitas; já o risco não pressupõe nenhuma premeditação prévia na ocorrência de atos ilícitos (Silva, 2017).

⁶ Uma milha marítima equivale a 1852 metros.

O tráfico de armas e de drogas, o contrabando de pessoas e de bens, o terrorismo marítimo, a pirataria e o assalto armado no mar contra navios, a poluição marinha deliberada, mas também a pesca IUU, representam, na atualidade, a fatia mais significativa de atividades ilegais e perturbadoras perpetradas no mar, ou a partir do mar (Council of the European Union, 2014, pp. 7-8).

A presente investigação centra-se, todavia, apenas na pesca IUU no Atlântico Sul.

2.3. A pesca ilegal, não declarada e não regulamentada

A pesca IUU engloba um conjunto de atividades relacionadas com a captura de recursos haliêuticos, mas que violam normas e regulamentos nacionais, regionais e internacionais de conservação e gestão das espécies e que são, ademais, incompatíveis com as responsabilidades dos Estados de bandeira (das embarcações de pesca envolvidas naqueles atos) (European Court of Auditors, 2022, p. 7).

Para mais fácil visualização, a Figura 1 mostra a representação dos diferentes espaços marítimos onde a pesca IUU pode ocorrer, designadamente: *Territorial Sea*⁷, *Exclusive Economic Zone*⁸ e *High Seas*⁹.

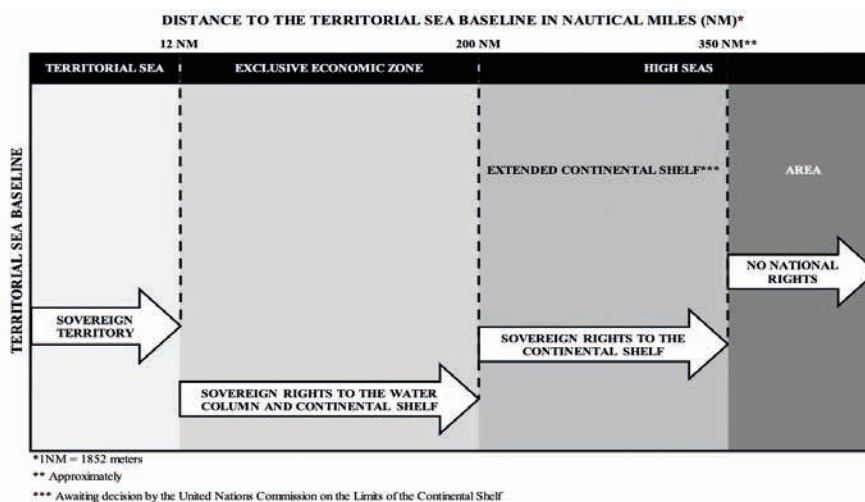


Figura 1 – Representação de diferentes espaços marítimos
 Fonte: Adaptado de *United Nations Convention on the Law of the Sea*¹⁰ (1982)

Detalhando, a pesca é considerada ilegal quando é efetuada sem licença ou autorização, quando põe em causa as medidas de conservação e de gestão (das espécies) definidas, ou, finalmente, quando atenta contra a legislação nacional e/ou obrigações internacionais.

⁷ Mar territorial, em português.

⁸ Zona económica exclusiva (ZEE), em português.

⁹ Alto mar, em português.

¹⁰ Convenção das Nações Unidas sobre o Direito do Mar (CNUDM), em português.

Entende-se que existe pesca não declarada quando as quantidades de pescado capturadas não são declaradas ou são deliberadamente declaradas incorretamente às autoridades competentes. Por fim, considera-se que existe pesca não regulamentada quando a atividade é exercida em zonas sem medidas de conservação e de gestão aplicáveis e de forma incompatível com as responsabilidades do Estado em matéria de conservação dos recursos marinhos vivos, ou quando o navio envolvido em atividades de pesca não tem nacionalidade (European Court of Auditors, 2022, pp. 7-8).

De entre as principais atividades de pesca ilícita, nas ZEE dos Estados costeiros e nas *Regional Fisheries Management Organisations* (RFMO)¹¹ situadas no alto mar, destacam-se: exercer atividades de pesca sem licença; utilização de embarcações sem bandeira ou com bandeira dupla; captura de espécies não permitidas, acima das quotas estipuladas, em áreas proibidas ou fora da época autorizada; capturas de pescado não declaradas às autoridades competentes ou declaradas de forma incorreta; utilização de artes e aparelhos proibidos e práticas de pesca abusivas; não utilização do sistema de monitorização de navios; cruzar ZEE de Estados de forma não autorizada durante a atividade de pesca; e transferência de pescado entre embarcações, no mar, sem permissão do Estado costeiro (US National Intelligence Council, 2016).

Os efeitos da pesca IUU são muito perniciosos, uma vez que esta depaupera significativamente as reservas de peixe. Constitui-se como uma das maiores ameaças aos ecossistemas marinhos e compromete os esforços de gestão sustentável das espécies, podendo mesmo levar, no limite, algumas delas ao colapso. Ocorre no alto mar e em espaços marítimos sob soberania ou jurisdição dos Estados, afetando especialmente as populações costeiras, sobretudo em zonas mais vulneráveis – como é o caso de alguns espaços do Atlântico Sul (Food and Agriculture Organization of the United Nations [FAO], 2023). Importa sublinhar, ainda, que a pesca IUU é potenciada por fatores adicionais como seja o conluio entre os que se dedicam a essa atividade ilícita e administrações corruptas de alguns Estados onde o fenómeno ocorre. Explora, de igual modo, regimes de gestão fracos, em particular de países em desenvolvimento que não dispõem de capacidades para implementar medidas de monitorização, controlo e vigilância eficazes, como acontece com muitos Estados do Atlântico Sul, em particular na sua margem oriental (FAO, 2023).

Por outro lado, a pesca IUU raramente é praticada de forma isolada – usualmente sobrepõe-se a outras formas de criminalidade, por exemplo atividades financeiras ilícitas, como fraude documental e crimes fiscais, branqueamento de capitais e corrupção. Estas atividades têm sido tradicionalmente associadas a sindicatos ligados ao crime organizado transnacional, o que sublinha, mais ainda, o facto de a pesca IUU ser, de igual modo, um tipo de crime organizado. Mas a pesca IUU facilita também o tráfico de droga, de armas e de seres humanos e fomenta a ocorrência de crimes ambientais. As embarcações de pesca podem ser

¹¹ Organizações regionais de gestão das pescas, em português. São organismos internacionais constituídos por Estados e organizações regionais (como a União Europeia, por exemplo) com interesses de pesca na mesma região ou no mesmo grupo de espécies de peixes (European Commission, 2024)

utilizadas, elas próprias, para esconder e transportar substâncias ilícitas ou reabastecer, no mar (combustível e víveres), os navios que o fazem. Além disso, o tráfico de seres humanos pode ocorrer em paralelo com a pesca IUU, em particular quando são prometidos empregos em embarcações de pesca a indivíduos que, uma vez embarcados, usufruem de condições sub-humanas, já que são amiúde ameaçados, sujeitos a trabalhos forçados, sem poderem fugir e com os seus salários retidos (Kaysser & Adal, 2020).

Pode concluir-se, assim, que a pesca IUU é uma das maiores ameaças aos ecossistemas marinhos devido à sua grande capacidade de minar os esforços nacionais e regionais para gerir as pescas de forma sustentável, com isso colocando em causa a conservação da biodiversidade marinha. É, ainda, amiúde, associada ao crime organizado transnacional e tira partido da falta de capacidade e/ou vontade de muitos Estados em combater o fenómeno.

3. Metodologia e método

Em termos metodológicos, seguiu-se um quadro epistemológico interpretativista, um raciocínio do tipo indutivo e uma estratégia de investigação qualitativa. O desenho de pesquisa seguido foi o estudo de caso, que tem sido abordado por diversos autores, entre eles Robert Yin (2015).

Utilizou-se como método preferencial de recolha de dados a análise documental, tendo sido consultada bibliografia diversificada de RI relacionada com os conceitos estruturantes da investigação (designadamente, segurança humana e segurança marítima), bem como vários estudos de segurança e ainda relatórios sobre a pirataria marítima e a pesca IUU.

Relativamente à delimitação nas usuais dimensões tempo, espaço e conteúdo, o artigo centra-se, respetivamente, no século XXI, no Atlântico Sul e no nexo de causalidade segurança humana – segurança marítima. O Atlântico Sul como espaço será, por sua vez, repartido em dois espaços específicos: Atlântico Sudoeste e Atlântico Sudeste. Este último será abordado em três subespaços: Pampa Azul argentina; Pradaria Azul uruguaia e Amazónia Azul brasileira.

O conceito estruturante da investigação é a segurança no domínio marítimo. A dimensão considerada é a segurança das populações ribeirinhas do Atlântico Sul. Os recursos haliêuticos e a pesca IUU são as variáveis definidas. A análise documental foi a técnica preferencial de recolha de dados. Foram consultadas várias fontes, tanto primárias (por exemplo, documentação estruturante do Conselho Europeu e da Comissão Europeia, de governos e de organizações internacionais) quanto secundárias (em particular livros, artigos científicos, outros artigos e relatórios diversos).

4. Apresentação de resultados

Este capítulo analisa os efeitos da pesca IUU e o modo como pode influenciar a segurança das populações ribeirinhas que nas duas margens do Atlântico Sul se dedicam à exploração lícita dos recursos haliêuticos, e de que forma essa potencial insegurança humana pode vir a manifestar-se na segurança marítima de toda a região, respondendo, dessa forma, à pergunta de partida.

4.1. A pesca IUU no Atlântico Sudeste

De acordo com um relatório da *Environmental Justice Foundation* (EJF) de 2018, a pesca lícita é fundamental para a segurança alimentar e a obtenção de rendimentos das populações costeiras da África Ocidental. Estima-se que cerca de 6,7 milhões de pessoas desta região dependam da pesca para a sua alimentação e subsistência, sendo o peixe responsável por mais de 50% do consumo de proteína animal em países como o Gana e a Serra Leoa. Face ao aumento da pobreza, as populações daquela região dependem cada vez mais da pesca para obter alimentos e rendimentos. No entanto, a pesca ilícita tem vindo paulatinamente a aumentar, o que resulta na sobre-exploração das reservas e na perda significativa de receitas¹². A costa ocidental de África apresenta das taxas mais elevadas de pesca IUU em todo o mundo, com cerca de 37% do total de capturas. Os prejuízos para as economias de alguns dos Estados daquela região estão estimados em cerca de 2,3 mil milhões de dólares anualmente. Apenas uma pequena fração destas perdas (cerca de 13 milhões de dólares) é recuperada todos os anos através de sanções por infrações relacionadas com práticas ilegais (EJF, 2018, p. 6). Mas a pesca IUU tem vindo a afetar, sobretudo, o desenvolvimento ambiental, social e económico da Nigéria. Em 2007, esta atividade empregava naquele país cerca de dois milhões de pessoas – a tempo inteiro, parcial ou em regime de lazer –, um número significativo que aumentou francamente desde então. O peixe é, por outro lado, vital para o crescimento económico e a estabilidade financeira das mulheres, que representam 73% das pessoas envolvidas na pesca na Nigéria (Okafor-Yarwood, 2020, p. 122).

Outro aspeto relevante está relacionado com o facto de embarcações de grandes frotas pesqueiras que arvoram pavilhões estrangeiros – incluindo de Estados-membros da União Europeia (UE) e de países do sudeste asiático, sobretudo da China – invadirem amiúde zonas tradicionalmente atribuídas à pesca artesanal. De acordo com a organização não governamental *Coalition for Fair Fisheries Arrangements*, as embarcações *Eighteen, Twenty, Myra Q, Idra Q, Pegaso Q e Orione Q*, registadas nos portos sicilianos de Palermo e Mazzara del Vallo, fizeram incursões frequentes em zonas costeiras reservadas à pesca artesanal da Serra Leoa, capturaram espécies para as quais não estavam licenciadas e realizaram transbordo de peixe sem autorização (FiskerForum, 2019). A este propósito, referiu Gaoussou Gueye, Presidente da Confederação Africana das Organizações Profissionais da Pesca Artesanal, que:

Quando vêm aos nossos países, os representantes da UE estão constantemente a falar da importância de combater a pesca ilegal. Argumentam que as frotas da UE pescam de forma legal e sustentável. No entanto, há embarcações da UE a envolver-se em operações que estão longe de ser sustentáveis, algumas delas completamente ilegais, como as atividades levadas a cabo por navios de arrasto italianos durante muitos anos na África Ocidental. Se a UE quer ter credibilidade e merecer a confiança dos africanos, não deve aceitar este tipo de comportamento por parte da frota de um dos seus Estados-membros. (FiskerForum, 2019)

¹² A pesca ilegal custa à região da África Ocidental quase 1,95 mil milhões de dólares em toda a cadeia de valor do peixe e 593 milhões de dólares por ano em rendimentos familiares (Africa Defense Forum, 2022).

Terminou, Gaoussou Gueye, afirmando que:

Numa altura em que a UE defende a pesca sustentável a nível mundial e afirma estar a liderar a luta contra a pesca IUU, é absolutamente inaceitável que permita que alguns navios com o seu pavilhão conduzam atividades relacionadas com a pesca IUU nas águas de países africanos com total impunidade. (FiskerForum, 2019)

Importa sublinhar, de igual modo, os alertas de cientistas para o colapso iminente de algumas espécies de peixe, em particular na região do Golfo da Guiné (GdG), se não forem tomadas medidas urgentes para travar as práticas ilícitas (Samari, 2019). Há espécies pelágicas em risco máximo – como a anchova, a cavala e a sardinha – que são muito relevantes para as economias locais, empregando diretamente mais de um milhão de pescadores artesanais na cadeia de valor só no Gana. Em 2020, a captura daquelas espécies pela frota pesqueira artesanal nas suas águas caiu mais de 85%, em relação ao pico registado em 1996 (Business and Financial Times, 2024). Referiu o EJP, em 2020, que o impacto das atividades de pesca ilegal nos anos anteriores foi tal que o Gana precisou mesmo de importar cerca de metade das necessidades de consumo de peixe das suas populações (EJP, 2020).

Mas há mais um fenómeno que tem vindo a afetar a pesca lícita na costa ocidental de África. Trata-se da captura de significativas quantidades de pescado por embarcações industriais estrangeiras que procedem, de imediato, ao seu congelamento e que é, mais tarde, transferido por pequenas embarcações para terra, para aí ser comercializado. Esta prática, conhecida por *saiko*, é ilegal no Gana e está a ter um impacto devastador, reduzindo significativamente diversas unidades populacionais de peixes naquele país, podendo vir a afetar mais de dois milhões de pessoas que dependem da pesca para a sua subsistência e segurança alimentar. Em 2019, o Banco Mundial destacou o "fraco compromisso do governo ganês em reduzir a capacidade de pesca do segmento industrial" e levantou preocupações relacionadas com navios estrangeiros que eram autorizados a registar-se no Gana, beneficiando de acordos de conveniência. Neste lote de Estados encontrava-se a China, que detinha a maior fatia de bandeiras de conveniência para navios de pesca industrial, sendo que, em 2019, mais de 95% dos navios com licenças ativas de pesca eram tripulados por cidadãos chineses (Samari, 2019).

Podemos afirmar, em síntese, que a pesca IUU no Atlântico Sudeste (em particular no GdG) acarreta custos muito significativos – sociais, económicos e ambientais. A pesca industrial em zonas de pesca artesanal e a proliferação de bandeiras de conveniência atribuídas a embarcações estrangeiras têm contribuído para o colapso eminente de várias espécies pelágicas.

4.2. A pesca IUU no Atlântico Sudoeste

O Atlântico Sudoeste não dispõe de uma RFMO, o que acrescenta complexidade à gestão de recursos haliêuticos naquela região. Os parágrafos seguintes analisam a pesca IUU relativamente a três relevantes Estados do Atlântico Sudoeste: a Argentina; o Uruguai; e o Brasil.

4.2.1. A pampa azul argentina

A Argentina é o Estado mais afetado pela pesca IUU no Atlântico Sudoeste, assumindo-se mesmo como um dos maiores focos de pesca predatória oceânica em todo o mundo. O governo e as populações costeiras locais estão conscientes da acumulação de pesqueiros de Estados de outras regiões do globo nas imediações da ZEE argentina, bem como das inevitáveis incursões nas suas águas de jurisdição. A vastidão da costa argentina torna particularmente difícil manter uma vigilância constante no alto mar, pelo que o país tem vindo a prosseguir uma política centrada na cedência da exploração dos recursos haliêuticos a capital estrangeiro (Barretto, 2024). A título de exemplo, em 2013, permitiu a entrada na sua ZEE de 20 navios de pesca chineses, com um regime de licenças alargado (variando entre os 10 e os 30 anos), regressando assim a uma prática usual na década de 1990 em que privilegiou, nessa ocasião, as frotas sul coreana e japonesa, em particular de pesca da lula (Lende, 2015, p. 86). Todavia, o acesso massivo (e descontrolado) de navios da frota de pesca distante de Estados da região da Ásia-Pacífico (sobretudo da China) tem levado, nos anos mais recentes, a um incremento significativo da pesca IUU e a um subsequente esforço da Argentina na investigação e desenvolvimento dos recursos do Atlântico Sul (designadamente através do lançamento do projeto “pampa azul”, em 2014) (MercoPress South Atlantic News Agency, 2014) e na garantia da autoridade do Estado no mar nas suas águas de jurisdição¹³. O panorama tornou-se tão dramático que a imprensa local começou a utilizar o termo “cidade flutuante” para se referir à imensidão de pesqueiros posicionados o mais próximo possível da linha das 200 milhas da costa. Dedicados principalmente à pesca da lula, os navios operavam à noite, utilizando poderosos refletores para atrair as suas presas para a superfície (Lende, 2015, p. 86). Por outro lado, a depredação dos recursos haliêuticos das águas argentinas e o *boom* das exportações resultantes das capturas conseguidas foram responsáveis pelo aumento dos seus preços no mercado interno. A escassez de peixe obrigou mesmo o país a recorrer às importações para evitar quebras internas – sendo que cresceram 3.121,90% entre 1990 (6.113 toneladas) e 2013 (190.843 toneladas) –, enquanto os preços suportados pelos consumidores argentinos foram 116% superiores ao valor internacional dos mesmos produtos (Lende, 2015, p. 87).

As práticas abusivas de captura de recursos haliêuticos nas águas de jurisdição da Argentina (em particular a pesca IUU) podem colocar em causa, a prazo, a segurança alimentar das populações locais deles necessitadas, uma vez que há menos peixe disponível no mercado (e quando existe os preços estão inflacionados por via da sua importação).

¹³ A título de exemplo, regista-se o facto de meios das Forças Armadas argentinas e da *Prefectura Naval* – a guarda-costeira argentina – terem lançado, em janeiro de 2024, a Operação Grifo XVII nas águas do Atlântico Sudoeste para reforçar a sua luta contra a pesca IUU, atento o facto de centenas de navios de pesca, principalmente de pavilhão chinês, terem vindo a apropriar-se, de forma ilícita, de muitos dos recursos haliêuticos da região. O Ministro da Defesa, Luis Petri, referiu mesmo, no início daquela operação, que existiam entre 450 e 500 navios, na sua maioria chineses, vindos da região do Pacífico, que atravessaram o Estreito de Magalhães e foram posicionar-se imediatamente após o limite da ZEE – no que convencionou designar-se por “*Mile 201*”, a região situada logo após as 200 milhas marítimas que delimitam aquele espaço (Delgado, 2024). É facilmente perceptível que a ausência de vigilância adequada tornará inevitável a entrada de boa parte (se não mesmo da totalidade) daquelas embarcações de pesca na ZEE argentina, pondo em causa os recursos haliêuticos existentes que ficarão à sua inteira mercê.

A Marinha e a *Prefectura Naval* argentinas têm procurado exercer a autoridade do Estado no mar, mas a extensa costa marítima¹⁴ assume-se como significativo constrangimento para um eficaz controlo do fenómeno da pesca IUU na região. E ainda que a Argentina não tenha sido, até à presente data, particularmente sensível à implementação de medidas alternativas baseadas num modelo de cooperação regional que permita fazer face a este problema – já que a pesca predatória no alto mar e os seus efeitos nos ecossistemas continuam a ser vistos como uma questão essencialmente de defesa dos recursos naturais nacionais contra a interferência estrangeira (Barretto, 2024) –, existe a percepção de que, num quadro continuado de exploração intensiva dos recursos vivos dos espaços marítimos argentinos, tais medidas poderão mesmo vir a ser, no futuro próximo, inevitáveis.

4.2.2. A pradaria azul uruguaia

Há hoje uma visão clara no Uruguai acerca da relevância do seu espaço marítimo, uma vez que é bem maior em superfície do que o território terrestre, o que demonstra a importância de saber valorizar e defender a sua soberania marítima. Isso mesmo sublinhou, em 9 de setembro de 2024, o Ministro das Relações Exteriores, Omar Paganini, no âmbito da cerimónia de apresentação de um novo mapa do Uruguai com as suas jurisdições marítimas, na qual abordou os conceitos “Uruguai Azul, expandindo horizontes” e “pradaria azul”, e referiu que dão a conhecer o Uruguai oceânico e as políticas do Estado relativas ao domínio marítimo, incluindo a sua visão estratégica para os portos e os seus acessos, as jurisdições marítimas, a soberania nacional, bem como novas oportunidades de atividades e desenvolvimento económico (Ministerio de Relaciones Exteriores, 2024).

De acordo com o índice de risco da pesca IUU (da Iniciativa Global Contra a Criminalidade Organizada Transnacional), o Uruguai permanecia, em 2019, entre os 26 melhores países do mundo em termos de esforços para combater a pesca IUU (Macfadyen & Hosch, 2023). No entanto, o porto de Montevideo é amiúde utilizado por navios de frotas pesqueiras distantes de Estados oriundos de outras regiões do globo que operam, sobretudo, nas imediações da ZEE da Argentina¹⁵. Estes navios atracam em Montevideo para descarregar as suas capturas, mudar de tripulação, reabastecer e proceder a pequenas reparações. É, por conseguinte, evidente o benefício que daí resulta para a economia local. Mas é, outrossim, um sinal claro de que estes comportamentos das autoridades podem potenciar a pesca IUU. E o facto é que, em 2022, o Uruguai caiu alguns lugares no posicionamento dos Estados melhor preparados para combater a pesca IUU (encontrando-se nesse ano na 39ª posição). Em 2023 voltou a cair alguns lugares, passando a ocupar a 62ª posição (em 152 Estados) (Macfadyen & Hosch, 2023, p. 114).

¹⁴ A Argentina tem uma costa marítima de quase 5.000 quilómetros e uma ampla plataforma continental (Delgado, 2024).

¹⁵ O transbordo incentiva a pesca IUU já que são utilizados navios de carga de grande porte, refrigerados, no mar, com embarcações de menores dimensões que lhes fornecem as provisões necessárias, o que lhes permite pescar durante meses seguidos fora dos limites das ZEE (Robbins, 2022).

A recente iniciativa do governo do Uruguai de dar maior visibilidade ao seu espaço marítimo (apresentando o mapa do país com as respectivas jurisdições marítimas), requer, em simultâneo, maior comprometimento dos seus responsáveis, porquanto é necessária a tomada de medidas concretas que permitam combater eficazmente as ameaças que pendem sobre tais espaços (como é o caso da pesca IUU e que o posicionamento do país no índice da iniciativa global contra a criminalidade organizada transnacional relativa a 2023 vem claramente evidenciar). Pese embora o Uruguai tenha sido signatário do *Agreement on Port State Measures*¹⁶ (PSMA), este acordo favorece os Estados que não são partes, mas que têm interesses relevantes no comportamento de determinados navios. Tais Estados devem ser informados se os navios suspeitos de pesca IUU nas suas águas forem inspecionados num porto de um Estado parte. Porém, o acordo é omissivo no que respeita aos Estados costeiros prejudicados pela pesca IUU no alto mar, na proximidade imediata da sua ZEE. Embora globalmente seja um instrumento valioso para promover a cooperação contra a pesca IUU, o PSMA apresenta algumas lacunas. Desde logo não fixa um número mínimo de navios a inspecionar por cada Estado do porto. Tal seria útil para evitar, por exemplo, que os Estados aderissem ao acordo apenas para mascarar a sua falta de interesse em controlar a pesca IUU fora dos seus próprios espaços marítimos. Por outro lado, apesar do PSMA reiterar constantemente a necessidade de cooperação entre os Estados do porto, os Estados partes, os Estados de bandeira e outros Estados interessados, não estabelece qualquer dever de promover inspeções a pedido de outro Estado parte. Acresce, ainda, que a aplicação do PSMA ao Atlântico Sudoeste traz apenas uma nova questão relacionada com a sua forte dependência das RFMO (que, conforme foi antes referido, não existem naquela região) (FAO, 2016).

Fica evidente, face às dificuldades encontradas no controlo da pesca IUU nos seus espaços marítimos, a necessidade de o Uruguai definir vias alternativas que permitam melhor enfrentar aquele fenómeno. A edificação de uma RFMO pode ser uma solução possível para o Atlântico Sudoeste. No entanto, o Uruguai precisa, em qualquer caso, de abdicar do processo de obtenção de lucros com a exploração da pesca predatória oriunda de outros espaços marítimos que não os seus e intensificar a implementação de medidas contra as práticas ilícitas de pesca enquanto Estado do porto.

4.2.3. A amazónia azul brasileira

O Brasil tem vindo a desenvolver uma política marcada pelo expansionismo marítimo ao longo de grande parte da segunda metade do século XX, sobretudo a partir da entrada em vigor da CNUDM, procurado “maximizar os espaços oceânicos sob jurisdição nacional, por um lado, e a força dessa jurisdição, por outro”¹⁷. Para o efeito, desenvolveu o conceito

¹⁶ Primeiro acordo internacional vinculativo que visa especificamente a pesca IUU e cujo objetivo é prevenir, dissuadir e eliminar a pesca IUU, impedindo que os navios envolvidos naquelas práticas ilícitas utilizem os portos e desembarquem as suas capturas (FAO, 2016).

¹⁷ O projeto do Brasil de maximizar os espaços marítimos sob sua jurisdição abrange o leito do mar e o subsolo subjacente. É em função disso que se encontra em processo de delimitação da sua plataforma continental estendida, no âmbito da Comissão das Nações Unidas sobre os Limites da Plataforma Continental (Commission on the Limits of the Continental Shelf, 2024).

“Amazônia Azul”¹⁸, que associa a substantiva dimensão geográfica e abundância associados à Amazônia “verde” aos espaços marítimos “azuis” (Barretto, 2024, p. 25). A importância da Amazônia Azul reside no facto de ser aí que se encontram as reservas do pré-sal e dele se retirar cerca de 85% do petróleo, 75% do gás natural e 45% do pescado produzido no país (Pereira, 2019).

Esta atitude assertiva gerou uma série de posições inovadoras em relação à CNUDM, que poderiam eventualmente ser mobilizadas para desencorajar a pesca sem restrições no alto mar mais próximo das fronteiras marítimas do país, uma vez que o Brasil (ainda) não considera a pesca predatória no alto mar como um problema que o afete diretamente. No entanto, a situação poderá alterar-se se vier a verificar-se um aumento da atividade pesqueira junto das suas águas de jurisdição (sobretudo praticada por navios estrangeiros, que são francamente flexíveis quanto ao local de captura e que, por isso, poderão facilmente entrar em “águas jurisdicionais brasileiras”¹⁹) (Barretto, 2024, p. 27).

A vocação marítima expansionista brasileira, a par da consciência dos recursos do mar e da afirmação do direito do Estado costeiro a utilizá-los para o bem-estar da sua população, em oposição à ingerência estrangeira, pode, outrossim, ser direcionada contra a pesca IUU. Nestas circunstâncias, caso as embarcações das frotas de pesca distante estrangeiras, que operam no limite exterior da ZEE brasileira, entrem dentro dos espaços jurisdicionais brasileiros, será expectável uma ação repressiva por parte das autoridades brasileiras. Porém, no caso de embarcações de pesca que praticam o arrasto de profundidade, ou que se encontrem em deficientes condições de navegabilidade, as autoridades brasileiras podem sempre intervir, argumentando que a atividade de pesca em questão ameaça a integridade dos recursos da plataforma continental nacional, validando uma intervenção mesmo no alto mar (Barretto, 2024).

Do que antecede fica perceptível que o Brasil não sente de forma evidente (pelo menos por enquanto) a ameaça da pesca IUU nas suas águas jurisdicionais. Está ciente da existência de diversos meios de frotas de pesca distantes de Estados de outras regiões (em particular da Ásia-Pacífico e da Europa) no alto mar (além, portanto, dos limites de jurisdição impostos pela CNUDM), mas não deixará de intervir se (e quando) julgar que foram colocados em causa os seus interesses próprios, isto é, quando tais embarcações forem detetadas em infração dentro dos seus espaços de jurisdição. Em todo o caso, parece evidente (também no caso do Brasil) que seja considerado um modelo de resposta multilateral, consubstanciado, por exemplo, na criação de uma RFMO que inclua, pelo menos, os três Estados objeto do presente estudo: a Argentina; o Uruguai; e o Brasil. Para que isso possa ser uma realidade, há ainda um

¹⁸ Com 7,4 mil quilómetros de costa, o Brasil tem sob sua jurisdição uma área imensa de 3,5 milhões de quilómetros quadrados de espaço marítimo. É essa área constituída por riquezas naturais e minerais abundantes que foi apelidada de Amazônia Azul, por comparação à importância da floresta amazónica para o país (Pereira, 2019).

¹⁹ Designa todas as águas marítimas sobre as quais o Brasil exerce algum tipo de jurisdição. É, portanto, um conceito concebido para permitir que a marinha do Brasil (que também tem atribuições típicas de uma guarda costeira) exerça vigilância e fiscalização em relação à pesquisa e exploração da plataforma continental brasileira (Barretto, 2024, p. 27).

longo caminho a percorrer, desde logo a necessidade de congregar vontades (amiúde pouco coincidentes ao longo das últimas décadas entre os três Estados em causa). A Argentina será, porventura, o mais reticente daqueles Estados, tendo em conta a possibilidade real de, a ser edificada uma RFMO no Atlântico Sudoeste, o Reino Unido vir a ser um dos Estados parte (por via das ilhas Falkland), com quem a Argentina mantém um diferendo prolongado no tempo. De qualquer modo, a ausência de uma RFMO na região do Atlântico Sudoeste torna-a singularmente desprotegida, sendo mesmo um dos últimos espaços não abrangidos por um acordo internacional de pesca, que importa, naturalmente, colmatar.

4.3. Relação pesca IUU – insegurança humana

Embora seja difícil determinar a dimensão exata da pesca IUU, estima-se que no início do corrente século pudesse ter uma ordem de grandeza de 11 a 26 milhões de toneladas em todo o mundo, correspondendo entre 11% e 19% das capturas declaradas, no valor de 10 a 23 mil milhões de dólares. Os países em desenvolvimento estavam (como ainda hoje estão) mais expostos ao risco induzido pela pesca IUU, sendo as capturas totais estimadas na costa ocidental de África 40% superiores às capturas comunicadas (Agnew et al., 2009, p.1). Com a perspetiva de obtenção de grandes lucros e com o risco de repercussões legais meramente residuais para os prevaricadores – devido à falta de capacidade da generalidade dos Estados costeiros para exercerem a sua autoridade – o incentivo para (continuar a) pescar de forma ilícita nas águas da costa ocidental de África é francamente elevado. Em consequência, aquela região apresenta o nível mais elevado de pesca IUU em todo o mundo – com 37% das capturas de recursos haliêuticos a serem efetuadas ilegalmente por embarcações de países como Taiwan, Tailândia, Coreia do Sul e Rússia, entre outros. Mas este preocupante nível de exploração prejudica gravemente a gestão sustentável dos ecossistemas marinhos do Atlântico Sudeste, comprometendo, simultaneamente, a segurança alimentar e os meios de subsistência das populações dos Estados costeiros (Brower-Berkhoven, 2014, p. 36), o que, em última análise, representa uma séria ameaça à estabilidade e segurança de toda a região – em particular no GdG (Igbogi, 2019, p. 30). A pesca IUU tem o potencial para destruir os meios de subsistência dos pescadores que usam práticas lícitas, devido à forma como aquela monopoliza os (parcos) recursos haliêuticos existentes. Esta situação afeta a generalidade dos países do Atlântico Sudeste de várias formas. Há implicações sociais de grande alcance, sobretudo porque a pobreza está a aumentar consideravelmente. Muitos ecossistemas estão à beira do colapso na região, o que terá um impacto significativo também em termos económicos e ambientais (Igbogi, 2019, pp. 30-31).

Infelizmente, tem sido difícil encontrar soluções eficazes para prevenir a pesca IUU ao largo da costa ocidental de África, devido, sobretudo, à capacidade que os prevaricadores têm demonstrado para contornar as medidas de conservação postas em prática por organizações regionais para gerir as pescas de forma sustentável (Logo, 2022, p. 14). Afirmou a este propósito o anterior Secretário-geral das Nações Unidas, Kofi Annan, que:

Nas águas costeiras de África, a pesca IUU atingiu proporções epidémicas. Esta pilhagem destrói comunidades costeiras inteiras quando estas perdem a oportunidade de pescar, transformar e comercializar [o pescado]. Os arrastões costeiros [...] estão a praticar um roubo organizado disfarçado de comércio. (Daniels et al., 2022, p.10)

Ao invés, tem existido uma panóplia de fatores que potenciam o crescimento da pesca IUU e que tornam o continente africano cada vez mais vulnerável. A governação errática de vários Estados do GdG é um dos fatores mais significativos. O legado de conflitos civis, agitação social e várias crises que têm assolado diferentes Estados da região são outros fatores que propiciam um terreno fértil para a pesca IUU prosperar. Por outro lado, vários relatórios sublinham que a utilização de sistemas de monitorização, controlo e vigilância marítima tem ficado aquém do que seria expectável. São conhecidos relatos que apontam para corrupção institucional e outros que referem que, mesmo quando são aplicadas sanções, estas são amiúde tidas por inadequadas – sobretudo quando cotejadas com o valor das capturas ilegais alcançadas (Daniels et al., 2022, pp 12-14). Os sistemas jurídicos são considerados desadequados, havendo a perceção de falta de vontade política para combater eficazmente a pesca IUU. Por fim, os espaços marítimos de jurisdição dos Estados costeiros não são patrulhados regularmente (Brower-Berkhoven, 2014, p. 37). Existe falta de cooperação regional e ausência de políticas de conservação e sustentabilidade dos recursos vivos (Igbogi, 2019, p. 31).

Em relação ao Atlântico Sudoeste, os efeitos da pesca IUU não se têm feito notar do mesmo modo. Os três Estados analisados (Argentina, Uruguai e Brasil) dispõem de meios do poder militar no mar (e da guarda costeira, no caso da Argentina) que lhes tem permitido evitar que as embarcações de frotas distantes de pesca de Estados de outras regiões do globo cruzem de forma evidente (e reiterada) as fronteiras dos seus espaços marítimos de jurisdição. Porém, a pesca além do limite das ZEE dos três Estados em causa, está, toda ela, fora do controlo de RFMO, porque simplesmente aí não existem. A pesca ilegal – não regulamentada, neste caso – pode comprometer, todavia, a prazo, de forma irreversível, muitos dos ecossistemas ali existentes. E isso contribuirá, necessariamente, para o aumento da pressão para a obtenção de recursos haliêuticos nos espaços marítimos onde existam, designadamente dentro das águas de jurisdição daqueles estados. Se (e quando) tal vier a ocorrer, serão os interesses desses Estados que serão colocados em causa. Haverá menos peixe disponível para ser capturado pelos meios das indústrias de pesca locais – pondo em causa a obtenção de rendimentos de várias populações – e até a segurança alimentar de muitas pessoas que utilizam o peixe na sua dieta alimentar pode vir a ser comprometida.

Neste contexto, é possível concluir que a pesca IUU no Atlântico Sudeste poderá ter implicações substantivas na segurança humana das populações ribeirinhas que acedem de forma lícita aos recursos haliêuticos disponibilizados pelo oceano, uma vez que pode vir a privá-las de fontes de sustento fundamentais, sendo, por outro lado, e face ao exposto anteriormente, improvável que as burocracias de segurança dos Estados costeiros tenham capacidade (ou sequer vontade) para combater aquele fenómeno. Na margem oposta, i.e., no Atlântico Sudoeste, a pesca ilícita ocorre sobretudo no alto mar. Todavia, é expectável que a pressão por acesso a recursos vivos do oceano venha a aumentar no futuro próximo

(sobretudo por parte de meios das frotas de pesca distantes de Estados de outras regiões) e isso possa implicar o incremento de atividades de pesca ilegal e não declarada dentro das águas de jurisdição dos Estados costeiros da região, trazendo dificuldades acrescidas às frotas de pesca desses Estados que poderão vir a ser confrontadas com menores capturas de peixe, pondo em causa a sua sustentabilidade.

4.4. Influência da insegurança humana na segurança dos espaços marítimos

Existe uma ligação de proximidade entre a pesca IUU, a pirataria e questões económicas mais amplas. Se recordarmos o fenómeno da pirataria somali, foi precisamente o declínio da indústria pesqueira do país, no final da década de 1990, que potenciou as já difíceis condições económicas existentes – desde a queda do regime de Siad Barre, em 1991 –, e que levou ao esforço de algumas populações ribeirinhas para recuperar a soberania sobre as reservas haliêuticas, abordando de forma aleatória navios de pesca estrangeiros que atuavam abusivamente e sem qualquer tipo de controlo – “detendo” ou “multando” as suas tripulações. O desejo dessas comunidades de defenderem os direitos de pesca (na ausência completa do Estado somali) e a subsequente perspetiva de obtenção de lucro fácil pode, de facto, ter servido como ímpeto original para se aventurarem em ações de roubo dos pesqueiros estrangeiros, mas propiciaram o aparecimento, mais tarde, da pirataria em larga escala nos diferentes espaços marítimos do Corno de África – sul do Mar Vermelho, Golfo de Áden e bacia da Somália (Lucas, 2013, p. 58). Há, como se verá de seguida, o potencial para o mesmo vir a ocorrer, a prazo, no Atlântico Sudeste (em particular nos espaços marítimos do GdG).

Assim, embora a pirataria no Atlântico Sudeste seja uma preocupação da comunidade internacional, a pesca IUU é mais inquietante para as populações locais. E as razões estão sobretudo centradas no facto da pirataria colocar em causa a segurança de rotas marítimas críticas para o comércio internacional (incluindo de energia). Mas para os países que são incapazes de patrulhar eficazmente as suas águas – como acontece com a quase totalidade dos Estados do GdG –, a pesca ilegal é um problema sistémico que pode afetar a autoridade do Estado no mar e ameaçar a estabilidade económica e social da região (Brower-Berkhoven, 2014, p. 36). O declínio (ou, no limite, a inexistência) de estruturas de imposição da lei no mar fortes, cria problemas de segurança adicionais e propicia o aparecimento de ações ilícitas – incluindo o incremento de atividades relacionadas com a pesca IUU. O efeito de “bola de neve” completa-se com o facto de os problemas poderem ser ainda agravados pela sobrepesca praticada pelas frotas de pesca internacionais. A delapidação das reservas haliêuticas pode ser de tal ordem que leve, inevitavelmente, a novo florescimento da pirataria e do assalto armado no mar contra navios no Atlântico Sudeste, em particular na região do GdG (Igbogi, 2019, p. 34).

Relativamente à pirataria, importa ter presente que, a partir de 2015, o GdG emergiu da posição de subalternidade em que se encontrava, sobretudo em relação ao sudeste asiático – uma vez que o fenómeno no Corno de África se mantinha em níveis residuais –, e entre 2018 e 2020 assumiu mesmo a condição de hotspot com mais incidentes reportados em todo o mundo (Alexandre, 2023, p. 169). Os três Estados com maior número de ocorrências

no período de 2017 a 2020 foram a Nigéria (com 187), o Gana (com 26) e o Benim (com 20) (International Maritime Bureau [IMB], 2021). O fenômeno conheceu uma inversão depois disso, conforme é visível na Figura 2 (onde estão representadas as variações de incidentes nos diferentes hotspots mundiais ao longo dos últimos sete anos).

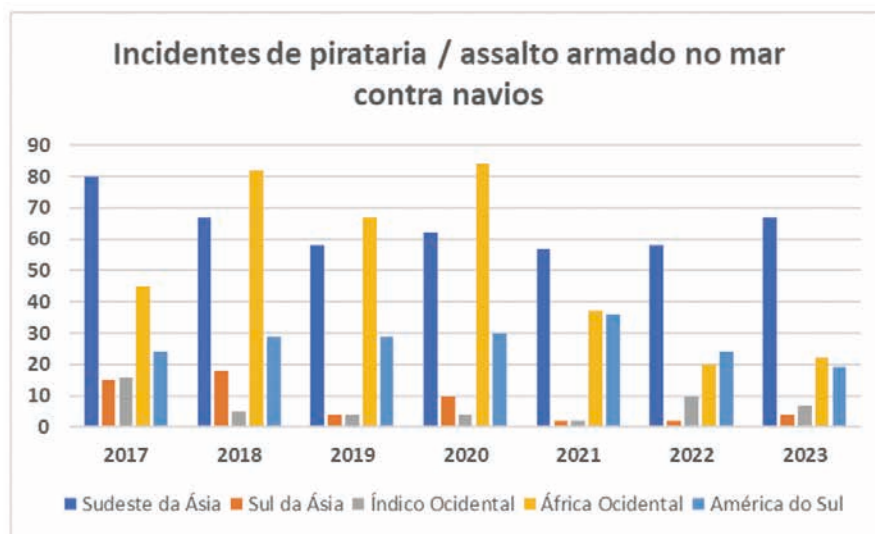


Figura 2 – Incidentes de pirataria/assalto armado no mar contra navios nos principais hotspots

Fonte: Adaptado de (IMB, 2023) e (IMB, 2024)

A Figura 2 mostra, de igual modo, que pese embora o número de ocorrências se tenha mantido baixo em 2021 e 2022 na costa ocidental de África (sobretudo no GdG), fruto das medidas que têm sido implementadas – mas que não serão desenvolvidas neste artigo por não fazerem parte do objeto de estudo definido – o fenômeno permanece longe de estar erradicado.

Todavia, existe potencial para que os valores relativos aos incidentes reportados nestes dois últimos anos possam crescer significativamente, influenciados pelo aumento descontrolado da pesca IUU. Se isso acontecer, fica em causa a segurança humana de vários milhares de pescadores de Estados da costa ocidental de África. E isso compromete seriamente a segurança alimentar de muitas populações da região que estão francamente dependentes da proteína animal que o peixe disponibiliza – e que é mesmo a única fonte para milhões de pessoas no GdG (Okafor-Yarwood, 2020). Por fim, o quadro de insegurança humana traçado manifestar-se-á no aumento da insegurança marítima em todo o Atlântico Sudeste, pela provável adesão de muitos pescadores locais a atividades ilícitas alternativas no quadro da pirataria e do assalto armado no mar contra navios.

Por outro lado, no Atlântico Sudoeste o panorama não se apresenta, nos dias de hoje, tão negativamente carregado. Os Estados costeiros da região (em particular a Argentina e o Brasil) são detentores de fortes dispositivos navais (sobretudo quando cotejados com a

generalidade dos Estados do Atlântico Sudeste) que lhes tem permitido fazer face à ameaça da pesca IUU na região, mesmo que a percepção daquela ameaça à segurança dos espaços marítimos seja diferenciada por parte do Brasil – dado que as ações de pesca ilícita têm ocorrido, por enquanto, quase só no alto mar. Mas essa percepção é extremamente volátil e pode alterar-se radicalmente se vier a assistir-se a um aumento das atividades ilícitas praticadas por embarcações das frotas distantes de pesca de potências oriundas de outras regiões do globo, em particular da Ásia-Pacífico.

Do que antecede, pode afirmar-se que a insegurança humana sentida no Atlântico Sudeste, em virtude da pesca IUU, tem o potencial para comprometer seriamente a segurança marítima de toda região. Por outro lado, de momento a situação no Atlântico Sudoeste não é tão crítica no que à pesca IUU diz respeito, mas a ausência de uma estrutura regional que permita regular e gerir a pesca no alto mar naqueles espaços marítimos pode levar a que venha a existir, a prazo, pesca IUU de forma mais acentuada nos espaços de jurisdição dos Estados costeiros, e com isso um aumento da insegurança de todos os que capturam e consomem peixe, comprometendo, dessa forma, a segurança marítima daqueles espaços.

5. Conclusões

A abertura da agenda de segurança ocorrida no final da Guerra Fria proporcionou o aparecimento do conceito de segurança humana que tem vindo, desde então, a ser associado a diversos valores, entre eles o desenvolvimento socioeconómico. Mas a segurança humana está também ligada à necessidade de ser garantida a proteção dos cidadãos mais vulneráveis, sendo que este epíteto é aplicável a todas as pessoas que são expostas a ameaças físicas diretas ou à provação do acesso a recursos que são fundamentais para a sua sobrevivência. O desenvolvimento em causa só poderá ser efetivamente alcançado se estiverem garantidas as necessidades básicas das populações, como o acesso a fontes de rendimento que promovam a sua segurança e bem-estar.

A pesca lícita é fundamental para a obtenção de rendimentos de milhões de pessoas que se dedicam a essa atividade nos espaços marítimos do Atlântico Sul e para a segurança alimentar de muitos outros, devido à proteína animal que o peixe disponibiliza. Todavia, esta pesca corre riscos significativos naquela região, uma vez que a pesca IUU tem vindo ao longo deste século a depauperar, de forma cada vez mais acentuada, os recursos haliêuticos, colocando em causa muitos ecossistemas marinhos. Algumas espécies de peixes (sobretudo pelágicas) já se encontram em sério risco de colapsarem, fruto de práticas disruptivas insustentáveis, como a sobrepesca, a pesca industrial em áreas de pesca artesanal, a falta de licenciamento e as capturas não autorizadas. Se a pesca IUU não for travada, em particular no Atlântico Sudeste, os custos sociais e económicos para as populações costeiras serão, a prazo, extremamente significativos: haverá muito menos capturas (e com menores quantidades de pescado), implicando perdas significativas de rendimentos dos pescadores locais, podendo mesmo, no limite, inviabilizar a continuação da atividade de pesca para muitos deles; se tal vier a ocorrer, vários milhares de pescadores serão compelidos a dedicar-se a outras atividades que lhes forneçam o sustento que o peixe deixar de garantir (podendo muitos deles enveredar

por ocupações ligadas ao crime organizado internacional, como aconteceu, por exemplo, na região do Corno de África, nos primeiros anos do século XXI).

Nestas circunstâncias, considera-se ter sido dada resposta à pergunta de partida, dado que foi possível aferir que a insegurança humana das populações ribeirinhas do Atlântico Sul provocada pela pesca IUU influencia, na atualidade, a segurança marítima daqueles espaços, ainda que de forma diferenciada nas duas grandes regiões que a constituem. No Atlântico Sudeste, a situação de vulnerabilidade da esmagadora maioria dos Estados da costa ocidental de África não permite o exercício efetivo da autoridade do Estado no mar, consentindo, ao invés, a captura descontrolada de recursos haliêuticos mesmo dentro dos espaços de jurisdição dos Estados. Esta situação pode vir a ter efeitos catastróficos, a prazo, nas comunidades costeiras de inúmeros Estados, levando a que muitos seus habitantes possam vir a enveredar por atividades ilícitas alternativas o que, no limite, irá comprometer a segurança marítima de toda a região. No Atlântico Sudoeste, a situação não é, ainda, tão crítica. A pesca IUU existe, mas sobretudo em espaços fora da jurisdição dos Estados considerados no presente estudo, sendo que todos eles dispõem de meios do seu poder (em particular militar) que lhes permite fazer face aquele fenómeno. A prazo, porém, a pesca IUU pode alastrar a áreas que se situam dentro das águas de jurisdição daqueles Estados. Nesse caso, são os recursos desses Estados que podem ser postos em causa e, com isso, comprometer a subsistência de todos os que aí se dedicam à pesca lícita. A segurança dessas pessoas pode ser posta em causa e, desse modo, pode ficar comprometida a segurança marítima de toda a região.

Tem-se o entendimento que este artigo contribui para o conhecimento do fenómeno da pesca IUU enquanto ameaça à segurança humana das populações que dependem da captura lícita de peixe para obterem o sustento de que carecem para a sua subsistência e para todos os que necessitam da proteína que o peixe disponibiliza para a sua segurança alimentar. O artigo contribui, ainda, para se perceber de que forma a insegurança das populações ribeirinhas pode influenciar a segurança marítima do Atlântico Sul, ainda que de forma diferente nas suas duas margens (no Sudeste e no Sudoeste do Atlântico). Por fim, o artigo contribui para a compreensão do nexos de causalidade entre dois conceitos – segurança humana e segurança marítima – relativamente recentes no quadro das relações internacionais, num espaço marítimo concreto, por se entender que ainda não existia um conhecimento profundo daquela relação causal.

As limitações deste estudo dizem respeito, sobretudo, à impossibilidade de alargar a investigação a mais países, particularmente pertencentes à costa da América do Sul e Caraíbas, por manifesta falta de espaço. Importa, por conseguinte, em próximos estudos, alargar a análise da pesca IUU a outros Estados da margem ocidental do Atlântico Sul e perceber de que modo esse fenómeno pode influenciar a segurança marítima de tais regiões.

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THE INFLUENCE OF HUMAN SECURITY ON THE SECURITY OF MARITIME SPACES: THE CASE OF THE SOUTH ATLANTIC

A INFLUÊNCIA DA SEGURANÇA HUMANA NA SEGURANÇA DOS ESPAÇOS MARÍTIMOS: O CASO DO ATLÂNTICO SUL

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Abstract

In the late 1970s, Kenneth Waltz said that, in the presence of anarchy, security is the ultimate goal of States, which may only pursue other ends when their survival is assured.

In the wake of the Cold War, there was a widening of the concept of security. Barry Buzan, Ole Wæver and Jaap de Wilde were among the leading theorists who questioned the focus on the State in the conceptualisation of security. After this broadening of the field to issues beyond the military political sphere, concepts such as human security and maritime security entered the international relations lexicon.

Using a qualitative research strategy, inductive reasoning and a case study methodology, this article analyses illegal, unreported and unregulated fishing in the South Atlantic, which has seen a surge since the beginning of the century and is now one of the most significant threats to the security and well being of the region's populations. The findings show that the depletion of fish stocks can undermine the human security of populations, driving people to engage in illegal activities that compromise maritime security in the South Atlantic.

Keywords: South Atlantic; fishery resources; human security; maritime security

Resumo

Afirmou Kenneth Waltz, no final da década de 1970, que, atenta a ordem anárquica vigente, a segurança era o fim mais alto dos Estados e estes apenas poderiam prosseguir outras metas depois de assegurada a sua sobrevivência.

Todavia, no final da Guerra Fria verificou-se uma abertura no modo como a segurança era interpretada. Barry Buzan, Ole Wæver e Jaap de Wilde contam-se entre os principais teóricos que questionaram a primazia do Estado na conceptualização da segurança. E o facto é que o seu

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alargamento a campos além do político-militar levou a que conceitos como segurança humana e segurança marítima tivessem emergido no léxico das relações internacionais.

Seguindo uma estratégia de investigação qualitativa e um raciocínio indutivo, este artigo analisa, a partir de um estudo de caso, a pesca ilegal, não declarada e não regulamentada no Atlântico Sul, uma vez que o seu crescimento ao longo deste século a guindou à condição de uma das mais relevantes ameaças à segurança e bem-estar das populações daquela região. As conclusões evidenciam que a crescente escassez de recursos haliêuticos pode colocar em causa a segurança humana das populações, levando-as a enveredar por atividades ilícitas que podem comprometer a segurança marítima do Atlântico Sul.

Palavras-Chave: *Atlântico Sul; recursos haliêuticos; segurança humana; segurança marítima*

1. Introduction

In the second half of the 20th century, the main theories on security followed the traditional realist school. This school of thought emphasises the constraints imposed on politics by human selfishness and the absence of international government, which require the primacy of power and security in all political life (Donnelly, 2005, p. 30). This approach was characterised by three elements: it emphasised military threats; it was status quo-oriented; and it was centred on states (Booth, 2007, p. 203).

Despite his neorealist origins, Barry Buzan was one of the leading theorists of the Copenhagen School (which had its roots in constructivism) (Huysmans, 1998 p. 483). In 1983, Buzan argued that the concept of security was more powerful and useful than its status at the time would suggest, and that it deserved to be elevated to an equal rank with power, which had been the dominant concept until then (Buzan, 1983, p. 2). In the early 1990s, the idea of a new, broader concept of security began to emerge which moved away from traditional theories' focus on states and military power to include the security of individuals and even the planet (Rothschild, 2007, p. 2). Several personalities (and organisations) discussed the issue during the first half of the decade. In his address to the United Nations General Assembly on 27 September 1993, President Bill Clinton spoke about a new understanding of the meaning and nature of national security and the role that individuals and states should play in it (Clinton, 1993). In 1995, the Commission on Global Governance – which had been established in 1992 to suggest new forms of cooperation to promote a global security agenda – recognised that security extends beyond the protection of borders and the exclusive interests of states and includes the protection of people. It did not exclude military threats from the security agenda: it proposed a broader definition of threats that included the humanitarian concerns that arose in the wake of the Cold War (Commission on Global Governance, 1995, p. 3). The main theme of the Human Development Report of the United Nations Development Programme (UNDP) for 1994 was the transition from nuclear security to human security. The report defines human security, in general, as safety from constant threats – such as hunger, disease and repression – and protection against sudden and hurtful disruptions (UNDP, 1994, p. 3).

A few years later, Barry Buzan, Ole Wæver and Jaap de Wilde proposed a new framework

of analysis for the field of security studies, which examined security dynamics in five distinct sectors: political, military, societal, economic and environmental. This framework clearly rejected the traditional approach that dominated Cold War thinking, in which security was only applicable to the military sector, defining it as a particular type of politics applicable to a wide range of issues. As a result, two separate visions emerged within security studies: the new vision, which defended that the concept should be widened to other fields; and the traditionalist view, which focused primarily on the military and the State (Buzan, Wæver, & Wilde, 1998, pp. 1-2).

In the beginning of the 21st century, Edward Kolodziej proposed that security was a complex and contested notion – charged with emotion and deeply held values – and that most people would agree that a security problem arises when someone – a person, group or even State – threatens the life, physical integrity or livelihood of others. For Kolodziej, its meaning could be extended to different values and interests – from the environmental damage caused by global warming to the struggle for subsistence of millions of communities in the developing world, or to the protection of human rights against various threats, including torture and genocide (Kolodziej, 2005, p. 1).

Therefore, we can say that the concept of security became relevant after the Cold War, and that it has acquired different meanings since. Human security, for example, encompasses a broad agenda and has become a meeting point for various actors who have attempted to raise awareness and support for issues related to development (economic, social and human) and humanitarian foreign policies (Buzan & Hansen, 2009, p. 205). Maritime security is another relatively new term in the conceptual edifice of international relations (IR), especially since the early 21st century, with the intensification of problems related to maritime terrorism and a spike in incidents of piracy, particularly of Somali origin (Bueger & Edmunds, 2017, p. 1293). The term highlights the new challenges in the maritime domain and points to how the problems they create could be addressed (Germond, 2015, p. 138).

This study analyses security in the maritime domain, particularly the impact of human insecurity on security at sea in a region that has become increasingly relevant since the beginning of this century – the South Atlantic¹ – due to the surge of threats in those waters, including the threat of illegal, unregulated and unreported (IUU) fishing.

The question that guided the research was: How does the human insecurity of the citizens of South Atlantic coastal states (caused by IUU fishing) affect maritime security in the region?

The article proposes that, if the security of people (mainly fishers) who use the sea lawfully is undermined by IUU fishing in the South Atlantic, the maritime security of the region will be compromised, as many will be forced to make a living in activities linked to transnational organised crime (such as piracy and armed robbery at sea against ships).

¹ In this article, this designation refers to the region of the sea that is bounded to the north by parallel 16° N, to the south by the Antarctic continent, to the east by the African coastline and to the west by South America (Brazilian Navy, 2020, p. 18). This region is delimited by “two large spheres of the southern region of the international system: Africa and South America” (Marins et al., 2020, p.1), which this study will analyse.

This study is relevant because it will examine the causal relationship between human security and maritime security (two concepts that emerged in the IR lexicon in the post-Cold War) in a specific region (the South Atlantic) facing a specific threat (IUU fishing). This article contributes to knowledge by examining the relationship between these two concepts and the conceptualisation of maritime security – a recent buzzword in the field of IR which has not been sufficiently explored, in the opinion of some leading theorists in the field (such as Christian Bueger).

The article is divided into five chapters. The first chapter is this introduction. The second chapter contains the theoretical and conceptual framework. The third chapter describes the research methodology. The fourth chapter contains the findings. The fifth and last chapter presents the study's conclusions, which confirm that IUU fishing is an obvious threat to the human security of the South Atlantic coastal populations who use the region's fishery resources lawfully, and that it could undermine maritime security in the whole region.

2. Theoretical and conceptual framework

This chapter contains the theoretical framework and key concepts of the study: human security; maritime security; and IUU fishing (one of the main security threats in the South Atlantic today).

2.1. Human security

Human security, a relatively new term in IR, has different interpretations. For the Canadian and Norwegian governments, it is associated with the most prominent progressive values of the 1990s: human rights, international humanitarian law and equitable socio economic development (Suhrke, 2007, p. 125). The section below will show that these values have been intrinsically linked to human security ever since.

After the Cold War, the international system underwent changes that led to various local and regional conflicts – or “new wars”, in the words of Mary Kaldor, which “involve networks of state and non-state actors” and in which “most violence is directed against civilians”, as opposed to the “old wars” that “involved states” and in which “battle is the decisive encounter” (Kaldor, 2012, p. vi). According to the principles of international humanitarian law (one of the values mentioned above), human security sought to civilise war and help its victims – saving lives and reducing people's suffering during armed conflicts (2012, p. 128).

But there is another starting point from which one can begin to explore what is at the centre of human security: human development. The UNDP report for 1994 – mentioned in the introduction – examines the relationship between human security and human development. The report describes human security both as an end state to be achieved – “safety from such chronic threats as hunger, disease and repression” – and as a process – “protection from sudden and hurtful disruptions in the patterns of daily life” (Suhrke, 2007, p. 129). As an end state, security was subdivided into sectors such as employment, health, education and the environment. Human security was essential for human development because there could be no development without a minimum of stability and security in everyday life. But the opposite

was also true: according to the report, long-term development improved social and economic life, producing more human security. In this sense, “there is no difference between human development and human security, or between process and the end state” (2007, p. 129). Astri Suhrke (2007, p. 130) argued that providing human security often meant taking immediate preventive measures. Human development, on the other hand, is a long-term process that aims to improve people’s wellbeing.

But what are the reasons for the need to protect the most vulnerable? For Robert Goodin, the rationale is that we have a responsibility for the misfortune of others (the “most vulnerable”). Goodin made a distinction between positive and negative duties. Positive duties are acts that are undertaken to produce a benefit for others. Negative duties include non-interference, refraining from doing harm to others (Goodin, 1985, p. 18). The “most vulnerable” are those who are exposed to immediate physical threats to their lives or who are deprived of the resources they need to survive. They are indirectly identified by human rights law, international humanitarian law and international refugee law. But there are also people whose lives are endangered due to extreme poverty or natural disasters. Therefore, there are three categories of extremely vulnerable persons: victims of war and internal conflict; those who live close to subsistence level and are structurally positioned on the threshold of socio-economic disaster; and victims of natural disasters (Suhrke, 2007, p. 131).

At the end of the 20th century, Paul Heinbecker (1999, p. 4) stated that “the components of human security are not new”. Heinbecker pointed out that “victimisation and impunity” were “as old as time” and “infectious diseases were as old as the plague”, that “civil wars date from the Treaty of Westphalia, at least” and that “crime, drugs and terrorism are contemporary challenges of age old phenomena”. Even “environmental despoliation”, a much more recent problem, had existed for generations. What was truly new was the phenomenon of globalisation, which made human security even more important, as threats became more visible and pressing. Heinbecker argued that the lethality of conventional warfare and the fact that most wars are now intrastate were also new factors, adding that “ninety percent of casualties are civilians, predominantly women and children” (1999, p. 4).

This study addresses the security and wellbeing of the South Atlantic’s coastal communities – Goodin’s “most vulnerable” persons –, who may be deprived of their rights to fisheries resources on which they depend for their subsistence by IUU fishing.

2.2. Maritime security

Since the late 1990s, maritime security has been used to describe preventive measures to counter illegal activities at sea (or from the sea). But it was maritime terrorism (which already existed and became more visible after the attacks against the US on 11 September 2001), and especially piracy – with the exponential rise in Somali piracy after 2007 – that brought maritime (in)security to the attention of the global press and the international public (Bueger & Edmunds, 2017, p. 1293).

Since then, the term has become a buzzword in academic circles. Christian Bueger (2015, p. 160), one of the leading contemporary theorists on maritime security, proposed

useful frameworks for analysing the concept: the “semiotics” framework (which maps the different meanings of the term by exploring the relationships between maritime security and other concepts); the “securitisation framework” (which provides tools to understand how different threats are included in maritime security); or “security practice theory” (which aims to understand the actions undertaken to create maritime security). The semiotic framework is the most useful to explore the issues analysed in this article. Bueger built a matrix with four dimensions (marine environment, economic development, national security and human security) and four concepts (marine safety, seapower, blue economy and resilience), as well as a set of risks and threats² (which include IUU fishing). Bueger proposed that maritime security can be understood by analysing the relations between each of these concepts (2015, p. 161).

Geoffrey Till (2009), one of the world's leading experts on naval power, proposed a different approach to maritime security. Like Bueger, Till analysed the threats that undermine it, but his model focused on controlling them by protecting good order at sea (in the areas of the ocean where such threats occur). It also involved different actors, and especially states (supported by regional organisations).

Maritime security deals with (illegal and disruptive) human activities at sea. Threats to maritime security affect states differently, depending on their geographical location. But a country's involvement in maintaining security at sea also depends on other factors, such as their capabilities and their will to combat threats to the maritime environment when they occur (Germond, 2015, p. 138).

Given the global nature of the sea and the transnational nature of many of the threats to its security, states that are not directly affected by them are contributing to common efforts to contain them because they understand that they will affect them later. In fact, since the beginning of the 21st century, many states (especially the most powerful) have been expanding their zone of control to maritime regions beyond their external boundaries, in what Basil Germond (2015, p. 139) called “postmodern territorial expansion”. Protecting free navigation and guaranteeing the safety of the global commons – the shared resources of humanity – could be a justification for states to deploy their naval forces beyond their traditional borders – the waters outside their sovereignty and jurisdiction, that is, the high seas – after the 200 nautical mile³ limit. Therefore, controlling distant areas of the sea is vital to guarantee the security of states' borders, at sea and on land (Germond, 2015, p. 139).

The most prominent illegal and disruptive activities at sea or from the sea are trafficking of arms and narcotics, smuggling of people and goods, maritime terrorism, piracy and armed robbery at sea and deliberate marine pollution, but also IUU fishing (Council of the European Union, 2014, pp. 7-8).

This study only addresses IUU fishing in the South Atlantic.

² The terms are distinguished in terms of premeditation: a threat requires an intention to commit illegal acts; a risk does not involve premeditation to commit an illegal act (Silva, 2017).

³ One nautical mile is equivalent to 1852 metres.

2.3. Illegal, unreported and unregulated fishing

IUU fishing refers to fishing activities that violate national, regional and international laws and regulations on conservation and management and are also incompatible with the responsibilities of the flag states (of the fishing vessels involved in those acts) (European Court of Auditors, 2022, p. 7).

Figure 1 shows a visual representation of the maritime zones where IUU fishing can take place: Territorial Sea, Exclusive Economic Zone and High Seas.

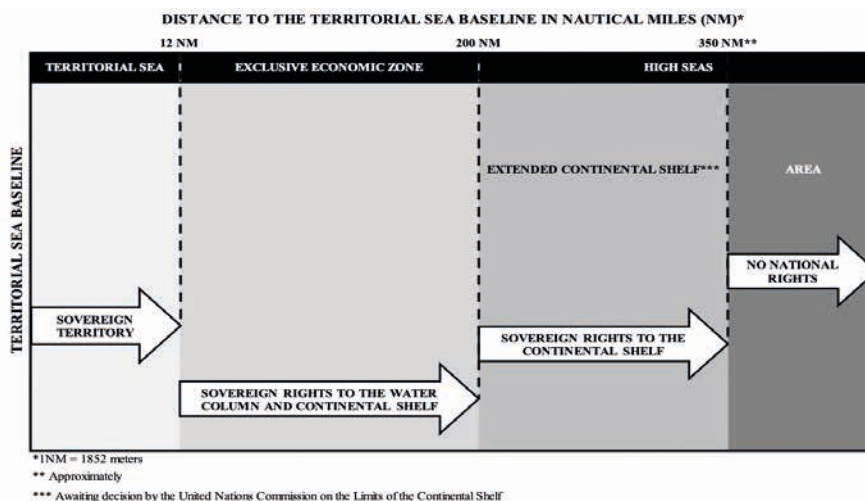


Figure 1 – Maritime zones

Source: adapted from the United Nations Convention on the Law of the Sea (1982)

Fishing activities are considered illegal when they are conducted without a licence or authorisation, when they undermine conservation and management measures or when they violate national laws and/or international obligations. Unreported fishing occurs when fish catches are not declared or are deliberately misreported to the relevant authorities. Finally, unregulated fishing refers to fishing activities conducted in areas with no applicable conservation and management measures, in a way that is inconsistent with the state's responsibilities in terms of conservation of living marine resources, or when the vessel involved in them does not have a nationality (European Court of Auditors, 2022, pp. 7-8).

Illegal fishing activities in the EEZs of coastal states and Regional Fisheries Management Organisations (RFMOs)⁴ in the high seas include: conducting fishing activities without a licence; using unflagged or double-flag vessels; catching prohibited species, above established catch limits, fishing in prohibited areas or outside the authorised season; not reporting or

⁴ International groups of states and regional organisations (such as the European Union) with fishing interests in the same region or in the same group of fish species (European Commission, 2024).

misreporting catches to the relevant authorities; using prohibited fishing gear and destructive fishing methods; failing to use the vessel monitoring system; crossing a country's EEZ without permission to conduct fishing activities; and transshipments (transfers of fish to other vessels) without permission of the coastal State (US National Intelligence Council, 2016).

IUU fishing is harmful because it depletes fish stocks. It is one of the most important threats to marine ecosystems, undermining the efforts to conserve and manage species, which can even cause some fisheries to collapse. It occurs on the high seas and in maritime regions under the sovereignty or jurisdiction of coastal states, affecting the people who live there, especially in vulnerable areas – such as the South Atlantic (Food and Agriculture Organisation of the United Nations [FAO], 2023). IUU fishing is facilitated by collusion between those who engage in illegal fishing and corrupt officials in some of the states where it occurs. It exploits weak management regimes, especially in developing countries that lack the means for monitoring, control and surveillance, which is the case of many South Atlantic states, particularly on the eastern coast (FAO, 2023).

On the other hand, IUU fishing rarely occurs in isolation – it often coexists with other types of crime, including illicit activities ranging from document forgery to tax crimes, money laundering and corruption. These activities are usually linked to international criminal organisations, which underlines the fact that IUU fishing is also a form of organised crime. IUU fishing facilitates trafficking in drugs, arms and human beings and opens the door to environmental crimes. Fishing vessels can be used to hide and transport illicit substances or to refuel other vessels at sea (supplying both fuel and food). Human trafficking can occur simultaneously with IUU fishing when people are promised jobs on fishing vessels and, once on board, are forced to work in subhuman conditions, often under threat, with their wages withheld and no way of escaping (Kaysser & Adal, 2020).

IUU fishing is a serious threat to marine ecosystems because it undermines national and regional efforts to manage fisheries sustainably, compromising the efforts to safeguard marine biodiversity. It is often associated with transnational organised crime, taking advantage of states' lack of means and/or will to combat it.

3. Methodology and method

This study uses an interpretive epistemological approach, an inductive qualitative research strategy and a case study research design, which has been discussed by authors such as Robert Yin (2015).

The data collection method was a literature review which included: works on IR which address the key concepts analysed in the study (human security and maritime security), studies on security and reports on maritime piracy and IUU fishing.

The study was delimited in terms of time, geographical location and content: the article analyses a 21st century phenomenon that occurs in the South Atlantic and addresses the causal link between human security and maritime security. The South Atlantic as a geographical space will be divided into two regions: the South West Atlantic and the South East Atlantic. The latter will be analysed in three sub-regions: Argentina's Blue Pampa; Uruguay's Blue Prairie and Brazil's Blue Amazon.

The key concept of the study is maritime security. The dimension that will be analysed is the security of the South Atlantic's coastal populations. The variables are fishery resources and IUU fishing. The data collection technique is a literature review, in which the primary sources were official documentation issued by the European Council and European Commission, governments and international organisations, and the secondary sources were books, scientific papers, articles such as this one and reports.

4. Study findings

This chapter analyses the impact of IUU fishing and how it affects the security of coastal populations on both shores of the South Atlantic who use fisheries resources lawfully, and examines how human insecurity can have serious consequences for maritime security in the whole region. This analysis will answer the research question.

4.1. IUU fishing in the South West Atlantic

In 2018, a report of the Environmental Justice Foundation (EJF) warned that legal fishing is essential because it is a source of food and income for the inhabitants of the coastal countries of West Africa. About 6.7 million people in the region depend on fishing for food and livelihood, with fish accounting for more than 50% of animal protein consumption in countries such as Ghana and Sierra Leone. The region is faced with growing poverty and increasingly relies on fishing for both food and income. However, illegal fishing has been increasing steadily, leading to overexploitation of fish stocks and significant loss of revenue⁵. The highest proportion of IUU fishing occurs on Africa's west coast (about 37% of total catches). Every year, the region's economies lose about 2.3 billion dollars to IUU fishing. Only a small fraction of these losses (about 13 million dollars per year) are recovered through fines for offences related to illegal practices (EJF, 2018, p. 6). In particular IUU fishing has also impacted Nigeria's environmental, social and economic development. In 2007, fishing provided employment to about two million people in Nigeria – on a full time, part time or recreational basis –, a significant figure that has risen since then. Fish is also vital for women's economic growth and financial stability (73% of fishers in Nigeria are women) (Okafor-Yarwood, 2020, p. 122).

Also important is the fact that vessels from large fishing fleets flying foreign flags – including from European Union (EU) member states and Southeast Asian countries, especially China – often invade traditional artisanal fishing grounds. According to the NGO Coalition for Fair Fisheries Arrangements, the vessels Eighteen, Twenty, Myra Q, Idra Q, Pegaso Q and Orione Q, which are registered in the Sicilian ports of Palermo and Mazzara del Vallo, made frequent incursions into areas reserved for artisanal fishing in Sierra Leone, have caught fish species for which they were not licensed and transhipped catches without authorisation (FiskerForum, 2019). Gaoussou Gueye, President of the African Confederation of Professional Organisations for Artisanal Fisheries, said:

⁵ Illegal fishing costs the West African region almost 1.95 billion dollars across the fish value chain and 593 million dollars per year in household income (Africa Defence Forum, 2022).

When they come to our countries, the EU people are always talking about how important it is to fight illegal fishing. They always argue that EU fleets fish legally and sustainably. Still, some EU vessels are involved in operations that are far from sustainable, some downright illegal, like the activities carried out by these Italian trawlers over many years in West Africa. If the EU wants to have credibility and be trusted by Africans, then it should not accept such behaviour by one of its Member States' fleet. (FiskerForum, 2019)

In his final remarks, Gaoussou Gueye said:

At a time when the European Union is championing sustainable fisheries globally and claims to be leading the fight against IUU fishing, it is unacceptable that it lets some EU-flagged vessels conduct IUU activities in the waters of African countries with total impunity. (FiskerForum, 2019)

Furthermore, scientists have warned that some fisheries are on the verge of collapse, and will collapse if urgent measures are not taken to curb illegal practices, particularly in the Gulf of Guinea (GoG) (Samari, 2019). Some pelagic species are especially endangered, including anchovies, mackerel and sardines, which are vital to local economies. In Ghana alone, they provide jobs to more than one million artisanal fishers in the value chain. In 2020, catches of these species by artisanal fishing vessels fell by more than 85% from the peak in 1996 (Business and Financial Times, 2024). In 2020, the EJJ reported that the impact of illegal fishing activities in the previous decade was so intense that Ghana needed to import about half of the fish consumed locally (EJJ, 2020).

Another factor that undermines legal fishing on the west coast of Africa is the capture by foreign industrial vessels of significant quantities of fish, which is frozen on board and transported by small boats to shore to be commercialised. This practice, which is known as saiko and is illegal in Ghana, is having a devastating impact, significantly depleting several of the country's fisheries, affecting more than two million people who depend on them for their livelihoods and food security. In 2019, the World Bank criticised the "Ghanaian government's weak commitment to reducing the industrial segment's fishing capacity" and raised concerns about foreign vessels that were allowed to register in Ghana, benefiting from ownership agreements. The state that issued the most flags of convenience for industrial fishing vessels was China (in 2019, more than 95% of vessels with active fishing licences were crewed by Chinese citizens) (Samari, 2019).

The social, economic and environmental cost of IUU fishing in the South East Atlantic (particularly in the GoG) is tremendous. Industrial fishing in artisanal fishing areas and the proliferation of flags of convenience issued to foreign vessels have contributed to the imminent collapse of several pelagic species.

4.2. IUU fishing in the South West Atlantic

The South West Atlantic does not have an RFMO, which makes the management of fish stocks in that region even more complex. The following section analyses IUU fishing in three important South West Atlantic states: Argentina; Uruguay; and Brazil.

4.2.1. Argentina's blue pampa

Among the South West Atlantic states, Argentina is the most affected by IUU fishing. The country has become a hotspot for predatory fishing. The government and the local coastal populations are well aware of the proliferation of vessels from foreign states exploiting fisheries in the areas adjacent to Argentina's EEZ, and of their incursions into their jurisdictional waters. Argentina's extensive coastline makes it particularly difficult to maintain constant vigilance on the high seas, leading the country to authorise foreign enterprises to exploit their fisheries resources (Barretto, 2024). In 2013, it allowed 20 Chinese fishing vessels to enter its EEZ, with licences that ranged from 10 to 30 years, returning to a practice that was common in the 1990s, when it granted squid fishing licences to South Korean and Japanese fleets (Lende, 2015, p. 86). In the last decade, this massive (and uncontrolled) granting of licences to vessels from distant fishing fleets from Asia-Pacific states (especially China) has led to a spike in IUU fishing. To tackle the problem, Argentina has stepped up efforts to research and develop its resources in the South Atlantic by launching the "pampa azul" project in 2014 (MercoPress South Atlantic NewsAgency, 2014), and to enforce the law at sea in its jurisdictional waters. The problem became so severe that the local press coined the term "floating city" to refer to the accumulation of fishing grounds in the areas adjacent to the 200-mile coastline. These vessels, which mainly fished for squid, operated at night using powerful reflectors to attract their prey to the surface (Lende, 2015, p. 86). On the other hand, the depredation of fish resources in Argentine waters and the boom in exported catches led to price inflation on the domestic market. The scarcity of fish has forced the country to rely on imports to prevent internal shortages – fish imports increased by 3,121.90% between 1990 (6,113 tonnes) and 2013 (190,843 tonnes). At the same time, the prices for Argentine consumers were 116% higher than the price of the same products in the international market (Lende, 2015, p. 87).

Abusive fishing practices in Argentina's waters (particularly IUU fishing) could compromise food security for local populations because there is less fish available for sale on the local market (and prices are inflated, as most fish is imported). The Argentinian Navy and the Prefectura Naval have made efforts to enforce state authority at sea and control IUU fishing in the region. However, the country's vast coastline poses significant challenges. Argentina has not been especially committed to implementing measures to tackle the issue through regional cooperation agreements – as predatory fishing on the high seas and its impact on ecosystems are still seen as a matter of protection of national natural resources against foreign interference (Barretto, 2024). However, it is aware that, if the intensive exploitation of living resources in its waters continues, such measures may become inevitable in the near future.

4.2.2. Uruguay's blue prairie

Uruguay is aware of the importance of its marine territory, which is significantly larger in terms of surface area than its territory on land, as well as of the importance of valuing and defending its maritime sovereignty. Minister of Foreign Affairs Omar Paganini stated

as much at a ceremony on 9 September 2024, in which he unveiled a new map of Uruguay that included the country's maritime jurisdictions. Paganini discussed the concepts of "Blue Uruguay", "expanding horizons" and "blue prairie", describing them as a way to promote oceanic Uruguay and the state's policies for its maritime spaces, including its strategic vision for the country's ports, maritime jurisdictions, national sovereignty and new opportunities for economic development (Ministerio de Relaciones Exteriores, 2024).

In 2019, Uruguay was one of the 26 countries leading the efforts to combat IUU fishing, according to the IUU fishing risk index issued by the Global Initiative Against Transnational Organized Crime (Macfadyen & Hosch, 2023). However, the port of Montevideo is frequently used by vessels from distant fishing fleets of states in other regions of the world that operate mainly in the areas adjacent to Argentina's EEZ. The vessels dock in Montevideo to unload their catches, change crews, refuel and make minor repairs. Even though this has clear benefits to the local economy, this behaviour from authorities can encourage IUU fishing. In 2022, Uruguay dropped to 39th place in the ranking of states best prepared to combat IUU fishing, and it dropped again to 62nd place (out of 152 countries) in 2023 (Macfadyen & Hosch, 2023, p. 114).

The recent initiative of the Uruguayan government to increase the visibility of its maritime space (by producing a map of the country with its maritime jurisdictions) also shows more commitment from the government since it must take concrete measures to effectively combat the threats to these spaces (which include IUU fishing, as shown by the country's ranking in the index of the global initiative against transnational organised crime for 2023). Even though Uruguay is a signatory to the Agreement on Port State Measures (PSMA), the agreement benefits states that are not parties to it, but which have relevant interests in the behaviour of certain ships. These states must be informed if vessels suspected of conducting IUU fishing activities in their waters are inspected in a port of a state party. However, the agreement does not mention coastal states which are affected by IUU fishing on the high seas in the areas adjacent to their EEZs. The PSMA is valuable instrument for cooperation against IUU fishing, but it has some shortcomings. First, it does not define the minimum number of vessels that each port state must inspect. This would be useful to discourage states from joining the agreement to disguise their lack of interest in controlling IUU fishing outside their own maritime spaces. On the other hand, although the PSMA repeatedly warns that there is a need for cooperation between port states, states parties, flag states and other interested states, it does not compel a state party to conduct inspections at the request of another. Furthermore, the application of the PSMA to the South West Atlantic highlights a new problem: the fact that it depends on RFMOs (which, as we mentioned, do not exist in that region) (FAO, 2016).

Given Uruguay's difficulty in controlling IUU fishing in its maritime spaces, it is clear that the country must find alternative ways to deal with this phenomenon. Establishing an RFMO could be a solution for the South West Atlantic. However, as a port state, Uruguay must stop the practices that allow it to profit from predatory fishing in other countries' maritime spaces and step up efforts to implement measures against illegal fishing practices.

4.2.3. Brazil's Blue Amazon

Brazil has been pursuing a maritime expansionism policy since the second half of the 20th century, even more so since the UNCLOS came into force. This policy aims to “maximize the oceanic spaces under national jurisdiction, on the one hand, and the strength of this jurisdiction, on the other”⁶. To do this, it developed the “Blue Amazon”⁷ concept, which links the vastness and abundance associated with the “green” Amazon to its “blue” maritime spaces (Barretto, 2024, p. 25). Brazil's pre-salt reserves are located in the Blue Amazon – about 85% of oil, 75% of natural gas and 45% of fish produced in the country is obtained from there (Pereira, 2019).

This initiative has led to a series of innovative policies based on the UNCLOS, which could be used to discourage unrestricted fishing on the waters adjacent to the country's maritime borders. Brazil does not (yet) see predatory fishing on the high seas as a problem that affects it directly, but this can change if there is an increase in fishing activity close to its jurisdictional waters (especially by foreign vessels, which are flexible about where they catch fish and can easily enter “Brazil's jurisdictional waters”⁸) (Barretto, 2024, p. 27).

Brazil's expansionist maritime policy and its awareness of the sea's resources and of its right to use them for the benefit of its citizens, rather than for foreign interests, can also be used to combat IUU fishing. If vessels from foreign distant fishing fleets operating close to the borders of Brazil's EEZ enter the country's jurisdictional waters, the Brazilian authorities are likely to take repressive action. However, in the case of deep sea trawlers or vessels operating in unseaworthy conditions, the Brazilian authorities can intervene if they deem that a vessels' fishing activities threaten the integrity of the resources on the national continental shelf, using it as justification to intervene, even on the high seas (Barretto, 2024).

As shown above, Brazil has not been affected by IUU fishing in its jurisdictional waters (at least not yet). The country is aware of the presence of distant fishing fleets from states in other regions (particularly Asia-Pacific and Europe) on the high seas (that is, beyond the limits of jurisdiction imposed by UNCLOS), and the Brazilian authorities will intervene if (and when) they deem that the country's interests are being jeopardised, that is, when a vessel is detected operating illegally in areas under national jurisdiction. Thus, it seems clear that, even in the case of Brazil, a multilateral response may be required. This could be done by establishing an RFMO that includes at least the three states analysed in this study: Argentina; Uruguay; and Brazil. But there is still a long way to go for this to happen. First, all three states must be willing to take that step (and this has not been the case in the last decades).

⁶ Brazil's project to maximise the maritime spaces under its jurisdiction encompasses the seabed and the subsoil. The country is in the process of delineating its extended continental shelf within the framework of the United Nations Commission on the Limits of the Continental Shelf (Commission on the Limits of the Continental Shelf, 2024)

⁷ With 7,400 kilometres of coastline, Brazil has a vast area of 3.5 million square kilometres of maritime space under its jurisdiction. Thanks to its abundant natural and mineral resources, this area has been dubbed the Blue Amazon, a term that evokes the Amazonian rainforest's importance for the country (Pereira, 2019).

⁸ This includes all the areas of the sea over which Brazil has some kind of jurisdiction. The concept was created to allow the Brazilian Navy (which also has typical coastguard duties) to monitor and control research and exploration activities on the country's continental shelf (Barretto, 2024, p. 27).

Argentina is perhaps the most reluctant because, if an RFMO for the South West Atlantic is created, the United Kingdom, with which Argentina has a long-standing dispute, will become a state party (through the Falkland Islands). However, the absence of an RFMO makes the South West Atlantic region especially unprotected: it is one of the last areas not covered by an international fisheries agreement, a situation that must be rectified.

4.3. The relationship between IUU fishing and human insecurity

While it is difficult to ascertain the exact impact of IUU fishing, it was estimated to have reached from 11 to 26 million tonnes worldwide in the beginning of the 21st century (11% to 19% of reported catches, which corresponds to a value between 10 and 23 billion dollars). Developing countries were (and still are) more vulnerable to IUU fishing: on the west coast of Africa, total catches are about 40% higher than reported catches (Agnew et al., 2009, p.1). There are considerable profits to be made and a fairly low risk of legal repercussions, as most African States do not have the capacity to intervene. This means that the incentive to fish illegally in the waters off the west coast of Africa is indeed high. As a result, that region has the highest rates of IUU fishing in the world – 37% of its fish stocks are caught illegally by vessels from countries that include Taiwan, Thailand, South Korea and Russia. Overexploitation compromises the sustainable management of marine ecosystems in the South East Atlantic and the food security and livelihoods of coastal populations (Brower-Berkhoven, 2014 p. 36), and is a serious threat to the stability and security of the entire region – especially in the GoG (Igbogi, 2019, p. 30). IUU fishing destroys the livelihoods of fishers who use legal practices because it monopolises fish stocks which are already depleted. This affects most countries in the South East Atlantic, albeit in different ways. The social implications are far-reaching, especially because poverty is on the rise. Many of the region's ecosystems are on the verge of collapse, which will have severe implications for the economy and the environment (Igbogi, 2019, pp. 30-31).

Unfortunately, it has not been easy to find effective solutions to prevent IUU fishing off the west coast of Africa, as transgressors are able to evade conservation measures by regional organisations to manage fisheries sustainably (Logo, 2022, p. 14). Former Secretary-General of the United Nations Kofi Annan stated that:

In Africa's coastal waters, IUU fishing has reached epidemic proportions. This plunder destroys entire coastal communities when they lose the opportunities to catch, process and trade. Commercial trawlers [...] are engaging in organised theft disguised as commerce." (Daniels et al., 2022, p.10)

Several factors have made the African continent increasingly vulnerable to IUU fishing. One of the most significant is political instability in several GoG states. A history of civil conflicts, social unrest and various crises that have plagued several states in the region are other factors that allow IUU fishing to thrive. On the other hand, several reports emphasise that maritime monitoring, control and surveillance systems have not had the expected results. Some reports mention institutional corruption, while others warn that, even when sanctions are applied, they are often insufficient – especially when weighed against the profit made from illegal catches (Daniels et al., 2022, pp 12-14). The legislation is inadequate and there is

a lack of political commitment to effectively combat IUU fishing. Finally, the maritime spaces under the jurisdiction of coastal states are not regularly patrolled (Brower-Berkhoven, 2014, p. 37). There is a need for regional cooperation and policies regarding the conservation and sustainability of living resources (Igbogi, 2019, p. 31).

In the South West Atlantic, the effects of IUU fishing have not been felt in the same way. The three states analysed in this article (Argentina, Uruguay and Brazil) have seapower capabilities (and a coastguard, in the case of Argentina) that allow them to prevent the vessels of distant fishing fleets from states in other regions of the world from repeatedly crossing the borders of their maritime jurisdictional spaces. However, an RFMO would not prevent those vessels from fishing beyond the limits of their EEZs, because no RFMOs have been established for those spaces. In the long term, illegal fishing – in this case, unregulated fishing – could irreversibly damage many of the region's ecosystems. This will inevitably lead to increased pressure on fisheries in the maritime spaces where they still exist, that is, in the waters under the jurisdiction of those states. If (and when) this happens, the interests of these states will be jeopardised. There will be fewer fish available for local fishing industries – leading to a loss of income for many people and threatening the food security of populations who rely on fish as a source of protein.

IUU fishing in the South East Atlantic could have dramatic consequences for the human security of coastal populations that exploit fisheries lawfully by depriving them of vital resources. On the other hand, it is unlikely that the security forces of coastal states have the capacity (or even the will) to combat the phenomenon. However, the pressure to extract living resources from the ocean will increase in the near future (especially by distant fishing fleets from states in other regions). This may lead to an increase in illegal and unreported fishing in the jurisdictional waters of the region's coastal states, creating new challenges for their fishing fleets by reducing fish catches and jeopardising their sustainability.

4.4. The impact of human insecurity on the security of maritime spaces

IUU fishing, piracy and wider economic issues are closely linked. In the case of Somali piracy, the decline of Somalia's fishing sector in the end of the 1990s worsened the country's already difficult economic conditions since the fall of the Siad Barre regime in 1991, leading coastal populations to attempt to regain sovereignty over fish stocks by boarding foreign fishing vessels that were engaging in predatory and uncontrolled fishing by "detaining" or "fining" their crews. These communities' desire to defend their fishing rights (in the absence of a Somali government) and the prospect of easy profits may have been what drove them to rob foreign fishing vessels, but it also led to large-scale piracy in the waters off the Horn of Africa – the southern Red Sea, the Gulf of Aden and the Somali basin (Lucas, 2013, p. 58). As the section below will show, this could occur in the South East Atlantic (particularly in the GoG).

While piracy in the South East Atlantic is a growing concern for the international community, IUU fishing is a bigger problem for local populations. While piracy compromises the security of critical international shipping lanes (including energy trade routes), illegal fishing is a systemic problem for countries that are unable to effectively patrol their waters –

almost all of the GoG states – because it can undermine law enforcement at sea and threaten the economic and social stability of the region (Brower-Berkhoven, 2014, p. 36). The decline (or lack) of means to enforce the law at sea creates other security problems and encourages illegal activities such as IUU fishing. Furthermore, the problems created by this snowball effect can be worsened by the overfishing practices of international fishing fleets. Fish stocks could be depleted to such an extent that piracy and armed robbery at sea against ships may once more become a problem in the South East Atlantic, especially in the GoG (Igbogi, 2019, p. 34).

The number of piracy incidents in the region increased since 2015, especially in relation to Southeast Asia – the problem was residual in the Horn of Africa –, and between 2018 and 2020, the region became a global hotspot for attacks by pirates (Alexandre, 2023, p. 169). From 2017 to 2020, the three GoG states with the highest number of reported incidents were Nigeria (187), Ghana (26) and Benin (20) (International Maritime Bureau [IMB], 2021). The situation has improved since then (Figure 2 shows the reported incidents in global hotspots over the last seven years).

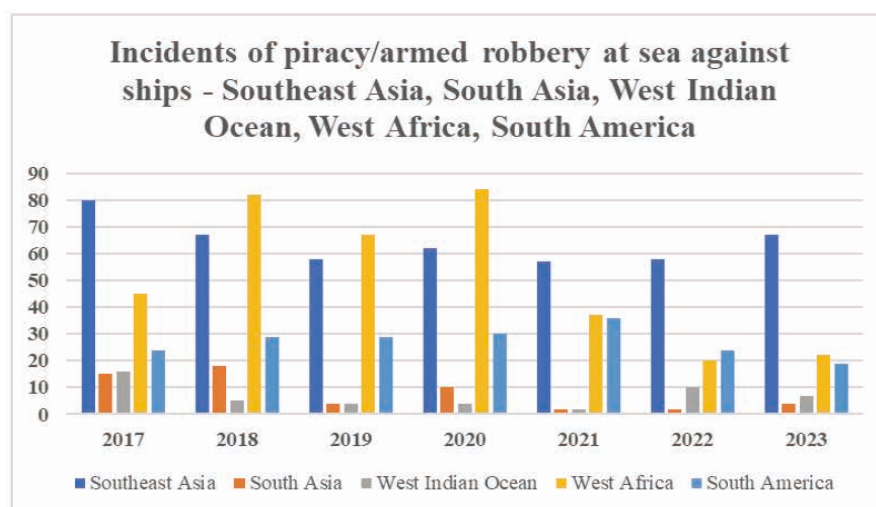


Figure 2 – Incidents of piracy/armed robbery at sea against ships in major hotspots
Source: Adapted from (IMB, 2023) and (IMB, 2024)

Figure 2 also shows that, even though the number of occurrences on the west coast of Africa – especially in the GoG – remained low in 2021 and 2022 (as a result of the measures that were implemented, which will not be addressed in this article as they fall outside the scope of the study), the phenomenon is far from being eradicated.

The number of incidents may increase even more (compared to the number of incidents reported in the last two years) due to the uncontrolled growth of IUU fishing. If this happens, the human security of several thousand fishers from states on the west coast of Africa will be jeopardised. This will compromise the food security of communities in the region who

depend on the animal protein that fish provides – and which is sometimes the only source of protein for millions of people in the GoG (Okafor-Yarwood, 2020). Finally, human insecurity will lead to an increase in maritime insecurity in the South East Atlantic, as many local fishers will have no choice but to engage in illicit activities such as piracy and armed robbery at sea against ships.

On the other hand, in the South West Atlantic, the outlook is less bleak. The region's coastal states (particularly Argentina and Brazil) have strong naval capabilities (especially when compared to most countries in the South East Atlantic) which allow them to combat the threat of IUU fishing in the region, even if Brazil has a different perception of this threat to the security of its waters – given that, for the time being, illegal fishing occurs almost exclusively on the high seas.

The above shows that human insecurity in the South-East Atlantic caused by IUU fishing could have serious consequences for the maritime security of the whole region. On the other hand, IUU fishing in the South West Atlantic is not a critical problem yet, but the lack of regional agreements to regulate and manage fishing on the high seas could lead to an increase in IUU fishing in the waters under the jurisdiction of coastal states. This will create more insecurity for people who catch and consume fish, compromising the maritime security of those waters.

5. Conclusions

The opening up of the security agenda in the wake of the Cold War led to the emergence of the concept of human security, which has since become associated with values such as socioeconomic development. But human security is also linked to the need to protect the most vulnerable people (those who are exposed to direct physical threats or deprived of access to resources that are critical for their survival). This can only be achieved by guaranteeing basic needs, which include access to sources of income that generate security and well-being.

Legal fishing provides an income for millions of fishers in the South Atlantic and contributes to the food security of the populations who depend on the animal protein that fish provides. However, the region's fish stocks have been depleted by IUU fishing since the beginning of the 21st century, endangering many marine ecosystems. Some fish species (especially pelagic fish) are already on the verge of collapse due to unsustainable practices such as overfishing, industrial fishing in artisanal fishing grounds, fishing by unlicensed vessels and unauthorised catches. If IUU fishing is not stopped, particularly in the South East Atlantic, the social and economic costs for coastal populations will be extremely high in the long term. There will be fewer catches (and smaller quantities of fish available) and a considerable loss of income for local fishers, many of whom may not be able to continue fishing. If this happens, several thousand fishers will be driven to other activities to obtain the income that fishing no longer provides (and many will find work in occupations linked to international organised crime, as was the case in the Horn of Africa region at the beginning of the 21st century).

The above analysis has provided an answer to the research question: the human insecurity of the South Atlantic's coastal populations caused by IUU fishing affects the maritime security

of these areas, albeit in different ways in the two regions that comprise it. In the South East Atlantic, the fact that the majority of states on the west coast of Africa are in a vulnerable situation means that they are unable to enforce the law at sea, and the uncontrolled capture of fisheries resources occurs even within those states' jurisdictions. This could have catastrophic long-term consequences for the coastal communities of many states, forcing many people to seek employment in illicit activities, compromising the maritime security of the whole region. In the South West Atlantic, the situation is not as critical yet. IUU fishing usually occurs in areas outside the jurisdiction of the states analysed in this study, all of which have the capabilities (namely military) to combat it. However, in the long term, IUU fishing could spread to areas within the jurisdiction of those states. If this happens, the resources of those states could be jeopardised, endangering the livelihoods of all who engage in lawful fishing in those areas. The security of these people could be threatened, which in turn would compromise the maritime security of the whole region.

This article aimed to explain the phenomenon of IUU fishing as a threat to the human security of those who depend on legal fishing to obtain the food they need for their subsistence and for all those who need the protein that fish provides for their food security. The article also aimed to understand how this insecurity for coastal communities could have consequences for the South Atlantic's maritime security, and how it affects the states on the South East and South West shores in different ways. Finally, the article illuminates the causal link between two concepts (human security and maritime security) which are relatively new in the lexicon of International Relations, in a specific maritime space.

The study's limitations include the fact that, due to length restrictions, it was not possible to analyse other countries on the coast of South America and the Caribbean. Future studies are needed to examine the impact of IUU fishing in other states on the western shore of the South Atlantic, as well as to understand its impact on the maritime security of these regions.

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INTEGRATING ADDITIVE MANUFACTURING TO MILITARY MAINTENANCE

INTEGRAÇÃO DO FABRICO ADITIVO NA FUNÇÃO LOGÍSTICA MANUTENÇÃO

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Abstract

The aim of this study is to investigate what kind of conceptual model should form the core for simulation model studying Additive Manufacturing (AM) in the military logistics supply chain. The focus of the study is on the Armoured Personnel Carrier (APC) vehicles spare parts in the mechanized battalion. In the study, the conceptual model of the key functions of a mechanized battalion's two-level maintenance system with AM support was modeled. Polymeric printing was employed for field- and depot-level maintenance, and metal printing was utilized for depot-level maintenance. We found that the conceptual model is an important phase in the simulation when designing a system where the number of 3D printers at two maintenance levels supports military logistics. We found that system dynamics depend on the intensity of battles (spare part demand), maintenance concept, and the size of the parts to be 3D-printed. It is also clear that the original material of spare parts affects the ability of AM to support the maintenance system, which may change the inventory planning.

Keywords: Additive Manufacturing; Military Logistics; Maintenance; 3D printing; AM integration

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Resumo

O objetivo deste estudo é investigar que tipo de conceito deve servir de base para um modelo de simulação que integra o Fabrico Aditivo (FA) na cadeia logística militar. O foco do estudo são os sobressalentes de Viaturas Blindadas de Transporte de Pessoal de um Batalhão Mecanizado. Neste estudo, foi desenvolvido um modelo conceptual das principais funções dos órgãos de manutenção para apoio a um Batalhão Mecanizado com recurso ao fabrico aditivo. A impressão plástica foi utilizada para a manutenção Intermédia (em operações) e de Depósito, enquanto a impressão em metal, foi utilizada para a manutenção de Depósito. O modelo conceptual é uma etapa importante na simulação, para projetar a quantidade de impressoras 3D necessárias nos dois níveis de manutenção, para apoio da sustentação logística. Verificou-se ainda que a dinâmica do sistema depende do nível de intensidade das operações (necessidade de sobressalentes), do conceito de manutenção e do tamanho das peças a serem fabricadas através de fabrico aditivo. Por fim, verificou-se que as propriedades das peças a fabricar, nomeadamente as características dos materiais, podem afetar a capacidade de o fabrico aditivo apoiar os órgãos de manutenção, podendo influenciar a definição das listas de sobressalentes.

Palavras-chave: *Fabrico Aditivo; Logística Militar; Manutenção; Impressão 3D; Integração do fabrico aditivo*

1. Introduction

Military logistics plays a crucial role in the execution of military operations (NATO, 2012; Zeimpekis et al., 2015; Minculete & Tutuianu, 2017). Through logistical functions, the combat capability of forces can be maintained and developed in accordance with the requirements of the operational environment (Black, 2021). Logistics has been described as the "bridge between military operations and the national economy" (Eccles, 1959). Logistics can be said to involve continuous support to the forces in various ways. With the advent of new technology, supporting the forces can be achieved in ways that were not previously possible. One such technology is additive manufacturing (AM), also known as 3D-printing.

In the Ukrainian war, there is a constant need for spare parts. The shortage of spare parts can lead to a diminished operational capability of the affected forces (Brewster, 2023). The use of additive manufacturing can enable the acquisition of spare parts when they are otherwise unavailable (Stevenson, 2023). As a result, several 3D printing devices have been donated to the Ukrainian conflict, aiming to address the challenge of spare parts availability and thus enhance the performance of the forces in battle (Harper, 2023).

In regards of the Ukrainian war and other sizeable military logistics operations it is crucial to acquire more information on the impact of the AM-technology. To this end the research question of this study is – what kind of conceptual model should form the core for simulation model studying additive manufacturing in the military logistics supply chain?

In Europe, several armed forces are adopting or planning to adopt AM (Department of Defence (DOD), 2021; Kremenetsky, 2022; Wood, 2020; Bundeswehr, 2022). The European

Defence Agency is conducting research to support the implementation of AM in member countries (European Defence Agency (EDA), 2024). NATO is finalizing a study that explores the method's use in NATO operations (NATO, 2024). The method can support the development of new military innovations, such as drone production (Goh et al., 2017), body armour (Peck, 2019), sensor production (Bird & Ravindra, 2021), and robotics (South, 2018). Another significant application is leveraging the method's features to enhance logistics in areas such as spare parts production (Knofius et al., 2021; Mustoe, 2023; Salmi & Pei, 2023), medical components (Gimbel, 2020), and the manufacturing of specialized components and tools (Blakey-Milner et al., 2021).

In recent years, the ability of additive manufacturing to support military logistics operations has been of interest to various armed forces (Rautio & Valtonen, 2022; González & Álvarez, 2018; Bundeswehr, 2022). One focus has been on producing spare parts for maintenance purposes. This approach aims to improve material availability by quickly restoring faulty or damaged systems back into service for deployed forces. Previous research has identified that additive manufacturing is suitable for decentralized, on-demand single-unit production, allowing the direct production of spare parts according to the needs of the armed forces (Khajavi et al., 2014). There are varying results regarding the production speed of the method (Zijlstra et al., 2022; Rautio & Valtonen, 2022), largely dependent on the operational environment in which the 3D-printing is conducted. Therefore, the impact of the quantity of produced items on performance and the overall system's availability has received less attention in the research.

The capability of logistics can be examined by recognizing that its performance depends on the resources used for its execution and the planning, management, handling, and utilization of these resources (Kress, 2000). Based on this definition, logistics can be viewed as a system, and its components can be considered subsystems that can be modeled. With a focus on maintenance capability, the impact of additive manufacturing on the availability of systems can be assessed.

In a previous study (Rautio & Valtonen, 2022) we explored through simulation how metal material additive manufacturing can support the field-level maintenance of a mechanized battalion in the two-level maintenance system. In this previous research, it was observed that the primary factor influencing the utility of using metal 3D-printing in maintenance is the slowness. The study found that, relative to the number of troops available to potentially use 3D-printers, it is not possible to operate enough printers at once in the field level maintenance to meet the needs of the troops. Drawing on the findings of previous research, we sought to determine whether greater advantages in maintenance could be realized by positioning metal 3D-printers at the depot level of two-level maintenance and polymer 3D-printers at the field level. This expansion two-level maintenance was the key motivation for this study.

The operational tempo of the operations and the nature of the battles create demands on maintenance. It creates demands also on the capabilities of 3D-printing, when the challenges of spare parts availability are addressed by printing parts directly to meet the needs. (Rautio & Valtonen, 2022)

Based on previous research, we have identified that the use of additive manufacturing at both levels of two-level maintenance is a more complex entity than the previously studied

support of the field-level maintenance level with metal 3D-printing. Therefore, we have decided to use conceptual modeling as the method in this study. In this way, the most essential factors that affect the simulation of the system can be determined. Conceptual modeling is an important stage in modeling and based on it, the final computational model can be coded with which the simulations can be carried out.

The key result of this study was that when modeling additive manufacturing as part of the maintenance and repair in the conceptual modeling phase of a mechanized battalion the following should be created: a failure model, model for maintenance process, model for inventory and its replenishment by Additive Manufacturing. These models allow us to identify the impact of the severity of the battles in relation to how the battalion obtains spare parts for its failing systems and how additive manufacturing can support this spare parts acquisition at two levels. The result of the study is a model and its parameters that can be used to code the model for mathematical simulation.

There has been disagreement among those involved in military additive manufacturing, from capability building, operational planning to those implementing operations, about where additive manufacturing equipment should be located in the logistical chain. 3D-printer manufacturers, original equipment manufacturers (OEM) of military systems, and 3D-printing service providers have their own views on what kind of equipment and where 3D-printers in military use should be located. In this study presented model can be used to make better informed and more rigorous assessment on additive manufacturing in military logistics.

The article is structured as follows. The next chapter discusses military maintenance. In the third chapter, additive manufacturing and its fundamentals are addressed. Chapter four presents the method used to create conceptual model of additive manufacturing and model created in the research. In the following chapter, chapter five provide a discussion and conclusions drawn from the results.

2. Theoretical and conceptual framework

2.1. Military Logistics

Historically, military logistics has been in existence for hundreds of years. The term "logistics" is context-dependent in its usage. It was first coined in 1846, deriving from the French word *logistique*. The military significance of the term was established by Antoine-Henri Jomini, an officer and writer in Napoleon's army, who defined it for the first time in his book: *Précis de l'Art de la Guerre*, in its 1830 edition. Jomini adapted the word from its French language origin, *logis*, meaning "lodging" or "quarters." Originally, its definition encompassed "the skill of organizing the army's operations, coordinating the order of troops in columns, their departure times, travel routes, and communication means necessary to ensure their arrival at a designated location." (Jomini, 1841).

Even in the early times preceding Jomini, fundamental aspects of logistics can be identified, primarily in the form of material transportation and storage. It is evident that the storage of food, in addition to military logistics, influenced the development of humanity (Black, 2021).

In its early stages, the term logistics was associated with only two distinct functionalities: transportation and storage (Topolšek et al., 2018).

The North Atlantic Treaty Organization (NATO) definition for military logistics is: "the science of planning and carrying out the movement and maintenance of forces – logistics covers the following areas (NATO, 2020):

- design and development, acquisition, storage, transport, distribution, maintenance, evacuation and disposal of materiel;
- transport of personnel;
- acquisition, construction, maintenance, operation and disposition of facilities;
- acquisition of provision of services;
- medical and health service support"

Logistics can be categorized in various ways. The services presented above are divided by NATO based on the operational environment into "production logistics, in-service logistics, and consumer logistics" (NATO, 2012). To facilitate the execution and organization of military logistics, it is common to categorize logistics into functions. This assists operators in understanding the responsibilities associated with each part of logistics. (Pääsesikunta, 2014) NATO's functionalities are divided into twelve different parts: Supply, "Materiel, Services, Logistic Information Management, Equipment, Maintenance and Repair, Movement and Transportation (M&T), Reception, Staging and Onward Movement (RSOM), Infrastructure Engineering for Logistics (IEL), Medical Support, Contractor Support, and Host Nation Support (HNS)" (NATO, 2012). In the context of additive manufacturing, it has been recognized that it can be utilized for the production of spare parts (Salmi & Pei, 2023). While the method may have other functions, this study specifically focuses on its role in the maintenance and repair function within military logistics. A closer examination of maintenance and repair allows for the assessment of the use of additive manufacturing in its functions.

2.2. Maintenance

Maintenance techniques is classified according to the European standard (SFS-EN 13306:2017, 2017) into corrective maintenance and preventive maintenance. The goal of preventive maintenance is to keep equipment in working order for as long as possible before it fails or breaks down. The goal of corrective maintenance is to repair failed systems and thus return them to use as soon as possible. Predictive maintenance can be seen as a separate maintenance technique in which the need for maintenance is predicted and the measures are related to the prediction (Mustafa, 2021).

Table 1 – Maintenance techniques

	Corrective Maintenance	Preventive Maintenance	Predictive Maintenance
Status of equipment	Malfunction	Malfunction	Working of malfunction
Reason of Maintenance	Fault	Planned inspection	Planned control
Maintenance Tasks	Replace of components	Downtime to maintenance, inspect and replace	Service
Purpose	Return to work	Working for period	Predict and detect faults

Source: Adapted from Mustafa (2021)

The definition of maintenance in NATO includes repair. Therefore, NATO's term encompasses both maintenance and repair, and in NATO operations, these are integrated. The NATO Logistics Handbook (2012) defines that these activities involve: "all actions, including repair, to keep or restore material to a specified condition. The operational effectiveness of land, sea, and air forces largely depends on the high level of preventive maintenance of equipment and related supplies during peacetime. Repair includes all actions taken to restore material to a usable condition as quickly as possible" (NATO, 2012).

Maintenance refers to keeping the material in operational condition and, if it malfunctions, restoring it to operational status as quickly as possible (Headquarters, Department of the Army, 2020). Maintenance functions encompass actions directed towards the material by various operators (Wilson, 2018). The effectiveness of forces in modern warfare is highly dependent on functional equipment (Antai et al., 2024). Therefore, efficient maintenance enables the operational readiness of forces in battles.

In accordance with the above definitions, this study examines corrective maintenance. In military maintenance, it refers to expedient repair activities, in which military systems are brought to a state where they can perform the military function specified for them. This includes the repair of battle damage, or Battle Damage Repair (BDR) (NATO, 2009).

The importance of maintenance is understood very similarly in different military organizations. On the one hand, the reason may be the similarity of functions, on the other hand, the standards in which maintenance is defined. In the common European standard, maintenance is a comprehensive function and is defined as: "Maintenance is the set of all technical, administrative and management-related measures, the purpose of which is to maintain the object in a state or return it to a state where it can perform the required function during its entire life cycle" (SFS-EN 13306:2017, 2017).

Military maintenance is divided into different levels. In a two-level maintenance system, the levels are classified as field and depot maintenance, shown in Figure 1 (Wilson, 2018). The purpose of field maintenance is to quickly repair malfunctioned systems back to troops. Field maintenance involves typically smaller maintenance actions, organizational and system-specific maintenance and repairs required for daily operations. At this maintenance level, intermediate repairs to weapon systems and components, as well as external repairs, can be performed. Field level maintenance is typically "less complex than depot level maintenance, serving as a link between strategic readiness and tactical requirements" (CJCS, 2019).

DEPOT – LEVEL MAINTENANCE		FIELD – LEVEL MAINTENANCE	
Industrial	Workshop	Intermediate	Organizational

Figure 1 – Maintenance system and levels

Source: Adapted from Pääsikunta (2014)

Depot level maintenance is tasked with providing maintenance for material requiring significant refurbishment or complete replacement “of parts, assemblies, subassemblies, and end items”. At this maintenance level, there may be a need to manufacture spare parts, make modifications, test, and if necessary, dispose of them, as well as serve as a distribution point for exchange items to field maintenance (CJCS, 2019). Depot level maintenance supports field level maintenance “by providing technical assistance or performing maintenance tasks” within its responsibility. Depot level maintenance collaborates with both industry and military operations. It also includes manufacturing and modification of new components. The demands of military operations require increasingly rapid logistical support. (NATO, 2012; US ARMY, 2014; US ARMY, 2013a)

The Ukrainian war has shown that military logistics has a significant impact on the execution and, above all, the success of operations. Skoglund et al. (2022) have examined the logistics of the Ukrainian war, analyzing both Russian logistical operations and Ukrainian countermeasures. Their conclusion was that the Ukrainian armed “forces understood the importance of Russian supply lines” and were able to act against them by combining traditional technology with innovative tactics. This significantly hindered the execution of Russia's "special operation" (Skoglund et al., 2022). This implies that supply lines “will play an increasingly” significant “role in future” military logistics.

In maintenance, especially at the field level, the primary principle is either replacing the entire damaged subsystem or parts with damaged material. In the traditional maintenance model, the performance of maintenance depends on the openness of supply lines. To keep supply lines open, they must be protected. This requires the integration of operational logistics into the operational planning process. Operational planning must consider the constraints of operation execution, the operating environment, and time factors. Grau and Bartles (2016) argue that this factor has been crucial for the success of logistical operations (Grau & Bartles, 2016). Skoglund et al. (2022) identify that the flexibility of logistics is crucial in supporting operations through military logistical measures. This is also supported by the findings that the polycentric defence model can support operations in different areas of warfare, including logistics. In the polycentric defence model, flexibility and adaptability enable the planning and implementation of operations where the need arises. In addition to direct military capabilities, commercial local actors and volunteers can be utilized for this (Alshamy et al., 2024). Without spare parts or the ability to repair damaged components, maintenance relies on the cannibalization of damaged equipment (Ormon & Cassady, 2004).

The use of spare parts can be based on spare parts inventories, on-hand maintenance reserves, or manufactured for special need (NATO, 2012). Typically, spare parts inventories are made during the material acquisition phase. Post-material acquisition, spare parts are often produced through outsourcing. Original Equipment Manufacturer (OEM) may not necessarily guarantee the availability of spare parts. This is often related to different versions of systems and associated obsolescence issues (Department of Defense, 2006). This characteristic differs from civilian material acquisition, where spare parts production typically relies on outsourced spare parts manufacturing and the absence of intermediate storage, resulting in the user having minimal spare parts inventories (GAO, 2005).

Previous studies have shown that additive manufacturing can produce spare parts for military systems (Khajavi et al., 2014; Rautio & Valtonen, 2022). These examples are anecdotal and do not directly demonstrate that additive manufacturing can widely produce spare parts for systems. In previous research, we have identified that the need for spare parts in a typical mechanized battalion battle can be so significant that additive manufacturing may struggle to meet that demand (Rautio & Valtonen, 2022).

The need for and use of spare parts is environment-dependent (NATO, 2012). The requirements imposed by the military operational environment necessitate exceptional flexibility in supply lines. In a military operational environment, the use profiles of systems can significantly differ from normal use cases. This may result in the need for battle damage repair (BDR) to be performed on systems. In these repairs, systems are aimed to be restored to combat capability by any means necessary. The military operational environment poses challenges in predicting system wear and the severity of damage caused by kinetic effects. Therefore, forecasting consumption complicates production planning (Pan & Nagi, 2010).

2.3. Additive Manufacturing

Matt Audette from US Marine Corps (2023) says:

In a nutshell, additive manufacturing is a game-changer for the Marine Corps. It allows us to repair equipment and innovate solutions right on the frontline. With its smaller footprint and easy-to-use technology, we can construct essential components right on the battlefield, making us nimbler and more responsive in any combat scenario.

Manufacturing can be divided into the traditional manufacturing and advanced manufacturing (Pereira et al., 2019). Traditional manufacturing can be described as: "the act of converting raw materials into finished products by using manual or mechanized transformational techniques" (Thareja, 2012). Different sources classify traditional manufacturing methods in different ways. Schuhumann (2022) classify methods by forming, separation, joining, and coating. These could be subclassified into a way where forming includes e.g. casting, deep drawing and stamping, separation includes all subtractive processes and coating includes spraying (Schuhmann et al., 2022).

Swift & Booker (2013) groups processes into categories such as casting, cutting, forming, and fabrication. Kalpakjian & Schmid (2020) organizes processes into categories like

casting, machining and finishing, joining, sheet metal work, polymer processing, and bulk deformation methods. One way to classify traditional manufacturing is: forming, welding and joining, machining by powder metallurgy and additive manufacturing (Narayanan & Gunasakera, 2023). A commonly used advanced manufacturing definition by President's Council of Advisors on Science and Technology (PCAST) (2011) is:

[...] a family of activities that (a) depend on the use and coordination of information, automation, computation, software, sensing, and networking, and/or (b) make use of cutting-edge materials and emerging capabilities enabled by the physical and biological sciences, for example, nanotechnology, chemistry, and biology. This involves both new ways to manufacture existing products, and especially the manufacture of new products emerging from new advanced technologies”.

Like Traditional Manufacturing, Advanced Manufacturing Processes and Technologies are defined different ways in different sources depending on the purpose. Zhong et al. (2017) categorize advanced manufacturing as following: “intelligent manufacturing, IoT-enabled manufacturing, and cloud manufacturing”. Chen (2017) divide Advanced Manufacturing to ten major technologies: 3D Printing, “Robotic Automation, Advanced Materials, Virtual reality, Industrial Internet, Cyber-Physical Systems”, “Big Data analytics, Cloud Computing, Applications and Mobile Devices”. Purpose for all Advanced Manufacturing technologies is to offer flexibility to lean manufacturing production. Advanced Manufacturing try to simplify supply chain and offer possibilities to single unit and very low-volume production with cost effective way (Pereira et al., 2019).

Additive Manufacturing (AM), commonly known as 3D printing, as a one of Advanced Manufacturing method, can open new possibilities for military logistics. AM is not just a single Advanced Manufacturing method, but a set of manufacturing methods that follow the same basic principle (Gibson et al., 2015). Like in other Advanced Manufacturing technologies, Additive Manufacturing is based on digital definition. Its distinctive feature, as per the definition, is to manufacture components by adding material, typically layer by layer, opposite to subtractive methods (ISO/ASTM 52900:2017, 2017).

The technologies of Additive Manufacturing are classified into seven main categories. These categories include “binder jetting, direct energy deposition, extrusion, material jetting, powder bed fusion, sheet lamination, and vat photopolymerization”. All emerging technologies and their combinations in Additive Manufacturing are classified into these categories (ISO/ASTM 52900:2017, 2017).

In Additive Manufacturing, the materials used greatly influence the applications for which components manufactured by the method can be used. Materials for Additive Manufacturing have advanced rapidly in recent years (Kanishka & Acherjee, 2023). Materials are typically classified into three categories: polymers and their composites, metals and their composites, and ceramics and ceramic composites. The most common printing materials are typically polymers and composites, as well as metals (Wohlers et al., 2021).

All 3D printers within the Additive Manufacturing seven main categories can print all the main material classes mentioned above. However, that does not mean that all systems can

print all materials. Typically, one type of material requires a manufacturing device specifically developed for it (Gibson et al., 2015).

3D printing devices can be classified into industrial-grade printers and non-industrial-grade printers. The division can be made based on various criteria such as the printer's build volume, production speed, manufacturing materials, or the printer's price (3DGENCE, 2023). Additive manufacturing can thus be either industrial production or the in-house production of an individual operator depending on different factors. Typically, non-industrial printers for individual or consumer operators are small, relatively inexpensive devices ranging from a few hundred to a few thousand dollars. These printers are typically operating with the extrusion method, which prints plastic materials from filaments. Other possible easily portable printers include machines using the vat photopolymerization method, although they require more tools for post-processing (Gibson et al., 2015). Military operators such as the United States Marine Corps (Michael, 2023), the German Bundeswehr (Bundeswehr, 2023), and the Dutch Armed Forces (Chemtron Pte Ltd, 2019) also utilize these tools. In the war in Ukraine, parts for various military needs have been produced using such printers (Feldman, 2022).

Industrial grade 3D-printers are typically larger, and their processes can involve a wider range of different materials (Gibson et al., 2015). These may include various metal alloys, more durable polymers, and bio-organic substances (Wohlers et al., 2021). In addition to the most commonly used metal materials such as titanium, aluminium, and stainless steel, other metals and their alloys have also become more prevalent as printing materials (Shi et al., 2021; Korpela et al., 2020). In addition to metals, industrial-grade devices can print a wide variety of polymers such as "Polyether Ether Ketone (PEEK), polyetherimide (ULTEM), acrylonitrile butadiene styrene (ABS), nylon, and polycarbonates (PC)" (Balaji, 2024). Industrial printers have been used by the Australian Defence Force to support their land and naval forces (Sertoglu, 2021; Burnett et al., 2018). Western countries have donated industrial-grade 3D printers to Ukraine to aid in warfare (Harper, 2023).

Additive manufacturing has evolved rapidly (Korpela et al., 2020). When examining the manufacturing industry, the method is quite new, making it difficult to predict its future development. The expiration of key patents in the 2010s and the significant increase in computing power have facilitated the method's use and the discovery of application possibilities (Gibson et al., 2015). The development of additive manufacturing as part of the manufacturing industry's evolution is illustrated in Figure 1.

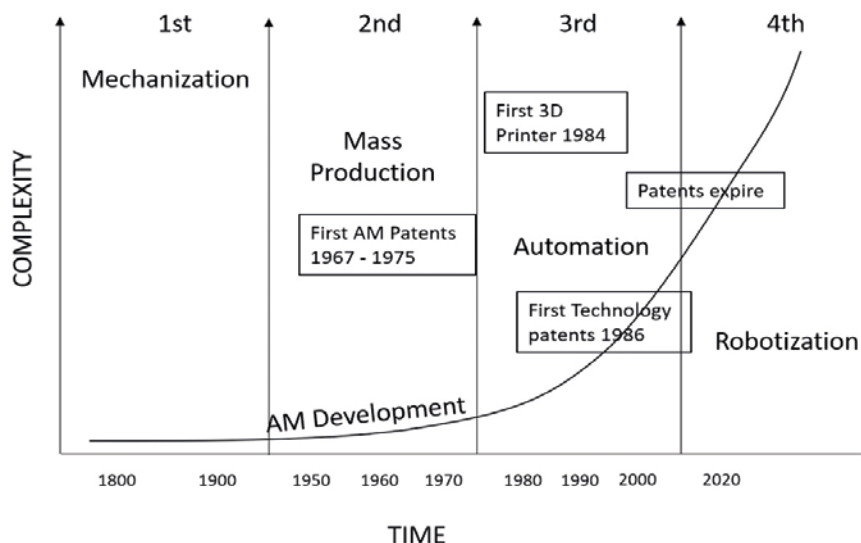


Figure 2 – Additive Manufacturing Development through industrial revolutions

Source: Adapted from Wohlers & Gornet (2016); Gibson et al., (2015)

The use of additive manufacturing for military purposes has not yet been fully established. The United States military has developed a roadmap and strategy for its use (Department of Defence, 2021). Most militaries are still in the experimental and testing phase. Some countries have made decisions regarding the method's usage and the integration of equipment into normal operations (Bundeswehr, 2022; Kremenetsky, 2022). Typically, AM is used in spare parts manufacturing and damage repair. The range of spare parts in military operations is extensive, leading to a variety of materials being used. Although metal additive manufacturing has been identified as crucial for military use, there is an increasing need to also consider the use of plastic materials in military settings (Rautio, 2023).

Earlier studies have shown that both metal and plastic additive manufacturing techniques can be employed to produce spare parts for armored personnel carriers (Rautio & Valtonen, 2022). Example parts are depicted in Figure 3. Previous research has also investigated the factors influencing the placement of metal 3D printers in a two-level maintenance system. The study identified that metal 3D printing has limited capabilities to support maintenance of a mechanized battalion-sized unit in combat missions at the current maturity level of the technology. The primary reason is that the speed of metal printing devices is insufficient to produce parts in the quantity required to have a meaningful impact on maintenance (Valtonen et al., 2022). The ratio of metal to plastic spare parts in the investigated MT-LB armored personnel carrier was approximately 1:20, with metal being the predominant material (MTЛБPVC, OOO, 2017).



Figure 3 – Additively Manufactured spare parts (polymer and metal) to Mechanized Battalion Armored Personnel Carrier (APC)

3. Methodology and method

Conceptual modelling means building a blueprint for a simulation model for the system under study. It “is probably the most important aspect of a simulation study while also the most difficult and least understood” (Robinson, 2008a). He defines it as: *“a non-software specific description of the computer simulation model (that will be, is or has been developed), describing the objectives, inputs, outputs, content, assumptions and simplifications of the model.”*

Conceptual modeling typically involves simplifying real-world complexities, and in the absence of reference data, it often relies on assumptions and informed guesses. Without such simplifications and assumptions, the model would essentially be a replica of the real system rather than an abstraction. When the problem situation is not well understood or clearly defined, the goal should be less about achieving accuracy in the conceptual model and more about using it as a tool for discussion and fostering a shared understanding of the problem (Robinson, 2008b). Robinson (2008a) suggested that a conceptual model must meet four key criteria: validity, credibility, utility, and feasibility. Naylor and Finger (1967) presented a three-step simulation model validation process including a face validity check by knowledgeable persons, model assumptions validation and comparing model input-output transformation to the real system known as the correlated inspections approach. As the last one is not possible in this case even when the simulation results are at hand, this leaves face validity and assumptions validation as validity criteria.

Understanding its implementation requires an in-depth analysis of its related sub-assemblies, which differ from typical industrial applications of AM. Specifically, the demand

for military system components, combined with the time constraints of military operations, can easily lead to errors in production decisions. The interactions between these sub-assemblies influence how AM should be integrated into a military logistics system. However, testing these sub-assemblies and their interactions in real-world scenarios would be extremely challenging. Beyond AM capability itself, a military system and various operational functions that impact its use would also be required. For this reason, modeling serves as the most viable approach to investigating the factors influencing AM integration in military logistics.

Conceptual modeling offers several key benefits, particularly in understanding complex systems. It helps structure information in a way that facilitates the design and development of systems using existing data. Additionally, conceptual modeling serves as an effective communication tool between different stakeholders (Thalheim, 2010). In this study, communication plays a crucial role in developing the model. Conceptual modeling helps convey key factors that military capability developers must consider when making decisions about additive manufacturing. One of its primary benefits is supporting decision-making by providing a clear and structured representation of the modeled phenomenon (Thalheim, 2010).

Different conceptual modeling methods can be used to generate information based on specific needs. Common modeling methods include the “Entity-Relationship Model (ERM), Unified Modeling Language (UML), Workflow Modeling, Event-Driven Process Chains (EPC), Statechart Diagrams, Data Flow Diagrams (DFD), Object Role Modeling (ORM), Structured Charts”, Rapid Application Development (RAD), Structured Analysis (SA), and Petri Nets. These methods can be used individually or in combination, depending on the objectives of the modeling process. (Fettke, 2009) The primary modeling approach used in this study is Event-Driven Process Chains (EPC). This approach enables the creation of a model that considers the effects and relationships between different activities and their corresponding events within the activity chain, presenting them in a logical sequence.

The aim of this model is to serve as a basis for computational discrete event simulation in addition to communication. David W. Embley et.al. (2011) discusses the conceptual model as programming: “A conceptual model is code”. The premise of this argument is that when creating a model, the model compiler ensures that the conceptual specification is sufficiently precise to enable software computation to be performed on it. This means that the model must be sufficiently complete and comprehensive to adequately represent the parts of its environment. The model must describe structure, functions and interactions. In addition, the model must be conceptual but precise (Embley et al., 2011).

Robinson (2008a) defines four key “requirements for a conceptual model: validity, credibility, utility, and feasibility”. He also emphasizes the importance of simplicity in the model (Robinson, 2008a). To evaluate the requirements presented by Robinson in his study, they must be examined more closely. Feasibility can be demonstrated through the creation of the mathematical model – that is, when the model can be coded for simulation with software. Credibility arises from experts agreeing that the model accurately represents what it is intended to describe. The usefulness of the model is proven when the information it produces can be utilized for its intended purpose. Among Robinson’s requirements, validity is the most

difficult to prove. There are many factors related to validity, specifically how accurate the model is. Robinson (2019) identifies three key challenges in creating a conceptual model for a discrete event simulation. These factors significantly impact both the validity of the model and the evaluation of its validity. The first factor is the conceptual model itself. The creator's experience and their understanding of the phenomenon underlying the model often play a critical role. The second factor is the model's framework. Developing a framework helps define the most important elements of the model. The third and final challenge is the presentation of the model. The ability to present the conceptual model in a clear, comprehensive, and communicative manner influences its validity (Robinson, 2019).

In this study, the impact of AM on military maintenance operations is investigated through conceptual modelling. A conceptual model is created to represent the capabilities of military logistics maintenance, additive manufacturing, and the failure of systems within a mechanized battalion in various combat scenarios. Based on the model, the system's operation is simulated, and conclusions are drawn from the simulation about how AM alters maintenance and what factors related to printing capacity should be considered when planning the use of additive manufacturing.

As presented in the previous chapters, military logistics – more specifically, maintenance and repair – is context-dependent; therefore, examining it at a general level is not meaningful. The relevant context provides an opportunity to analyze in more detail the factors that affect the implementation of logistics. For the purpose of dimensioning and comparing capabilities, we have created a model in this conceptual study, following the same principles used in previous studies on the maintenance of a mechanized battalion.

4. Presentation and discussion of the results

The model focuses on the availability of armored personnel carriers (APCs) in a mechanized battalion under war-like battle conditions. We create a conceptual model to examine the supply chain factors influencing the battalion's maintenance capability, incorporating both field and depot-level maintenance, in alignment with standard NATO logistics practices (NATO, 2012).

The model consists of three sub-models: the Model for Battle Damages, the Model for the Maintenance Process, and the Model for Inventory and Its Replenishment by Additive Manufacturing. By integrating these sub-models into a single conceptual model, the most critical functions within the overall system can be identified. The sub-models facilitate simulation and calculation. Adjusting their parameters to reflect different scenarios allows Additive Manufacturing to support case-specific two-level maintenance.

The model excludes supply from higher-level logistics centers, as it assumes a high-intensity battle lasting approximately two weeks (15 days), during which the mechanized battalion must be self-sufficient. Additionally, we focus only on parts that can be manufactured using additive manufacturing (AM) and exclude others when analyzing AM integration into military maintenance.

4.1. Model for battle damages

There are two aspects in battle damages in the conceptual model. The first is the battle intensity (BI) that determines the proportion of damaged APCs i.e. how many APCs are damaged each day. The second is the extent of damages that determines whether it can be repaired and if so, at depot or field level. When modelling the battle intensity, the assumption is that the use of APCs is constant and therefore damaged APCs are proportional to available APCs. The other possibility would be a constant transport need, constant number battle damages and increasing APC utilisation with diminishing availability. Damages can be modelled e.g. by each day, for each available APC randomizing if it is damaged with BI probability and pacing damage occurrence randomly across the day. The battle intensity is seen as a decision variable in the model.

For the damaged APCs, the extent of damages is modelled so that 10% are destroyed; 20% suffer heavy damage and require depot-level repair and finally, 70% receive light damage that is repaired at the field level. The estimation of the damage extent to APCs in battle is derived from previous studies on the battle damage experienced by armored units (Peltz et al., 2004). Lightly damaged APCs are repaired at the nearest field level location. As there are three locations, the individual lightly damaged APCs arrive at field level maintenance location with a randomised chance 1/3 for each. To our knowledge, there is no publicly available data on what and how many parts are damaged especially with MT-BL.

For APCs with minor damage maintained at the field level, there were five metal spare parts, each with a 50% probability of being damaged, and two plastic parts with a 25% chance of damage. Heavy damages were modelled 20 metal spare-parts that each had a 50% chance of being damaged and two plastic parts with 50% damage probability. The 50% chance means that damage to any part is independent of that to other parts. The numbers of parts were greatly reduced from the actual number of parts while having a rather high value for part damage. This was done with the idea simplifying the model while still gaining knowledge of the effects of decision variables. Finally, it must be noted that deep uncertainty remains regarding extent of damages as well what parts and how are damaged in an actual conflict because of e.g. the tactics, enemy weaponry and terrain.

4.2. Model for maintenance process

The extent of damages determines the maintenance level. Destroyed APCs cannot be repaired while heavy damages are repaired at depot level, and light damage can be fixed at field level maintenance. The model of the process in Figure 4 contains one field-level depot and three geographically separate field level maintenance facilities.

When a damaged APC arrives to maintenance it is checked whether all damaged parts, both metal and plastic, are available in the stock. If any part is missing, the APC will wait until all parts are available and then reduces the inventory for each damaged part. The APC is moved into repair or, if every lot is occupied, queuing until a lot is vacated. We exclude the possibility of using damaged or destroyed APCs as a source of spare parts for other APCs, even though this is sometimes observed in practice.

Each of the three field-level maintenance stations has three repair lots, while the depot level has ten lots. The repair times for the APCs are fixed at 4 hours for field-level maintenance and 20 hours for depot-level maintenance, regardless of the number of parts that are actually damaged. Field-level maintenance should be performed in six hours and if the repair need is more extensive, it is repaired at depot level. Repair times are informed by Kunnessapito-opas (2003). In reality, repair times are variable within limits but are here modelled as averages for simplicity. Maintenance personnel were excluded from the modeling because personnel availability is not considered a constraint.

There is no transport time at the field level, because the material is maintained directly near the point of failure. Heavily damaged APCs need to be towed to the depot-level maintenance, and being located in the rear, there is transport time back and forth. Transport time to the depot level is modeled as a constant 20 hours, with another 20 hours for the return trip to the battlefield. This is based on the operational area's depth and width of the mechanized battalion, as well as the estimated distance from the frontline to the rear.

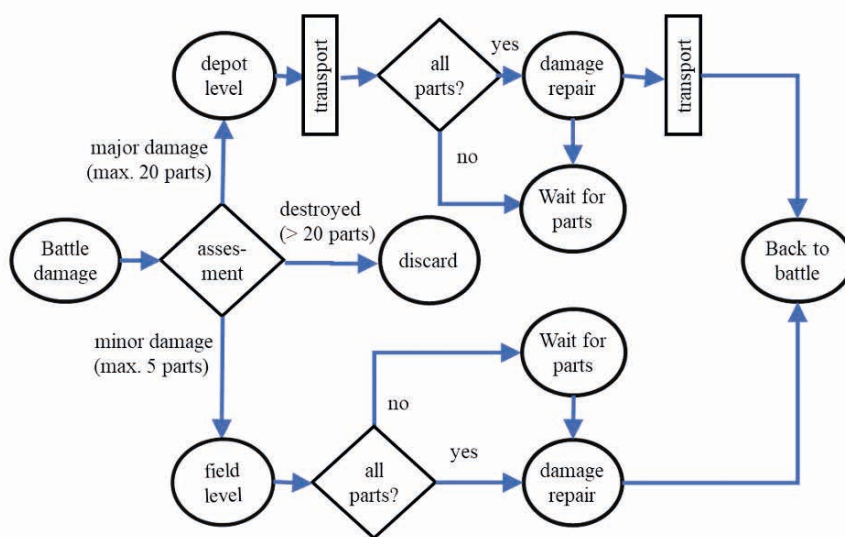


Figure 4 – Maintenance Process Flow

4.3. Model for inventory and its replenishment by additive manufacturing

There is an initial inventory for all parts in both depot level and each of the three field level units. Even though there are defined levels for spares inventories, it is hard to know their status at the beginning of the battle as they may have been depleted prior to the start of the battle i.e. modelling start. Moreover, the AM would not be needed if there were unlimited amount of initial inventory, but this is not the case due to costs.

Initial inventories of metal and plastic parts at field and depot level are modelled through specifying the initial inventory level in expected Days-of-Supply (DoS). Days of Supply (DoS)

levels are translated to amount of initial inventory by calculating the expected daily spare parts requirement with 77 APCs and medium battle intensity, maintenance level and 50% damage likelihood. As the damage likelihood is equal (50%) for each part (except for 25% of field level plastic parts), the initial inventories are set equal for all parts in that instance which is based on more perfect i.e. unbiased estimate of damage between parts. This kind of information is not available in advance of real scenario. The initial inventory is modelled as a decision variable.

The polymeric printing is located both at field level and depot levels as the machines are of low acquisition cost. The metal AM machine capability is only at depot level as they cost more. Metal parts can be ordered to replenish field level depot inventory with a 20-hour transport time of finished parts to field level. Part manufacturing times are based on our previous study (Valtonen et. al., 2022). The AM capacity i.e. number of machines, is a decision variable in the model. Each inventory is replenished from its AM machines with a lot-for-lot control. As the model period is two weeks, it would be optimal to draw down the inventories during the period. However, as this duration may not be known in advance, we order immediate AM replenishment for each part that is consumed. As AM lot size is one, the reorder lot size is also one. For metal parts transports to field level there probably could be some transport lot size but this is omitted.

4.4. Model decision variable and their values

Decision variables describe those factors whose values can be influenced within certain limits. In our model, the decision variables are the intensity of fighting, the capacity of additive manufacturing, and the level of the initial spare parts inventory:

- The Battle intensity (BI) is modelled with following values of low (10%), medium (20%) and high (30%) proportion of damaged APCs out of those that are in use during that day.
- AM capacities can have the following values: no AM capacity at the field level, baseline capacity (seven metal AM machines and one plastic AM machine), high capacity of five times baseline.
- Initial inventory levels with values of (DoS 2), medium (DoS 4) and high (DoS 8) that should be calculated based on medium BI scenario.

4.5. Performance measures and outputs

The model includes the following performance measures that inform about the relative quality of each scenario or combination of decision variables in each model run:

- The time it takes to reach availability under 50 % i.e. how long mechanised battalion has at last 39 APCs in use and not destroyed, in or waiting for repair or in transportation. This is the main performance measure of the model and is based on assumption that with 50 % losses capability is seriously reduced.
- How many APC days are available can be calculated by simply summing the available APCs for each day.

As outputs that illustrate the model performance and help in verifying the results, the following are used:

- The inventory levels in total as well as by individual part inventories.
- The AM queue levels.

4.6. Discussion

Using the conceptual model, a simulation model may be developed with which various scenarios of how the method can be evaluated at different maintenance levels. Such a simulation model can provide maintenance systems with information on the implications of AM for spare parts logistics for each stakeholder. Through simulations, decisions can be made regarding the adoption of additive manufacturing. These simulations can guide technological choices regarding the types of 3D printers and materials to be used at each level of maintenance.

Although previous research shows that additive manufacturing can produce individual spare parts, our conceptual model suggests that its implementation in maintenance supply chains is influenced by multiple factors. Through conceptual modelling the following key model performance factors and sources of uncertainty were identified:

- Initial spare part inventories that together with the other battle variables determine the need for AM manufactured spare parts.
- APC Battle Damage model and the battle intensity together determine maintenance requirements, there is very high uncertainty regarding both of these variables. For example, initial data for faults other than normal wear are difficult to define, and uncertainty is high.
- Additive Manufacturing capacity is determined by the number and speed of the individual machines as well as features of the parts. While features of the parts can be studied the number and speed of the machines are decision variables but they also contain uncertainty in practical battalion battle conditions.

Regarding the choices made in the model, it has been recognized that they are partially system-dependent and not directly applicable to other countries with different maintenance concept. Therefore, the conceptual model cannot be directly used for examining maintenance of all military systems concerning AM. Its general features can be used to describe common functions, but detailed choices need to be examined considering the specific characteristics of different branches and military system types.

5. Conclusions

Based on the information obtained from the war in Ukraine, it is known that AM is used for military purposes. Military applications of AM include not only spare parts but also new innovations and parts that can replace other components. In wartime situations, in addition to the shortage of spare parts, military forces are likely to have a wide range of needs that additive manufacturing can fulfill. In this study we examined one use case - spare parts – and created a conceptual model for one - militarily relevant - unit.

There is only a little practical experience in using AM to support the maintenance of an operational military unit, as AM is a novel technology. Therefore, it is unclear how the capability of additive manufacturing can enhance military logistics and support units. Of particular interest is determining the types of 3D printers and how many printers should be deployed and where within the overall military logistics system. That is creating AM military supply chain strategy.

In terms of potential, it is essential to understand the shift in manufacturing from Traditional Manufacturing to Advanced Manufacturing methods. It enables digital manufacturing. Regarding digital manufacturing, additive manufacturing and its simplest 3D printers enable printing near the troops. Although printing with such devices may not produce the highest quality parts, they can be essential for the operation of the military unit.

The study identified that in the development of the conceptual model for AM simulation, it is essential to thoroughly understand the operations of military activities, maintenance systems, and AM. In addition to the researchers' own experiences, familiarity with transportation equipment maintenance and additive manufacturing timelines and systems enabled the creation of a conceptual model for simulation. Detailed examination of the systems of one mechanized battalion's personnel carrier – MT-LB – enabled the analysis of 3D-printable spare parts in terms of quantity, material, and size. Based on this, the estimates for AM manufacturing times of the model could be established.

The conceptual model includes the parts that are in Robinson (2008a) definition: objectives, inputs, outputs, content. Even though we did not provide an independent face validity test of the conceptual model, this paper follows the advice of Robinson (2008a) making assumptions and simplifications explicit and declaring these openly.

As a result of the study, factors related to the unique characteristics of AM usage were identified in addition to the model. The benefits of the manufacturing method can be recognized as part of the entire logistics chain. While the armed forces of different countries have varying needs, operational environments, and starting points regarding the use of AM as part of logistics, this study generates information on how production capacity can be planned and allocated. Common principles of maintenance provide a solid foundation for applying the research results not only to the entire logistics system but also in the planning and execution of military operations. This study contributes to the understanding of logistics, particularly the use of additive manufacturing, in special conditions, even beyond military logistics.

The possibility of additive manufacturing to support maintenance could enable a completely new approach because manufacturing can be brought close to the troops. This means that the benefits of using the method can be achieved from the method itself, not necessarily from the logistics chain. In the model, it was recognized that the benefits of additive manufacturing in the spare parts logistics chain and its support may be marginal with current 3D printing capabilities, but significant benefits can be obtained by transforming the user into a manufacturer. If the user becomes a manufacturer, this transformation needs to be considered in all capability factors. The change entails reevaluating the entire system in a new way, not just importing 3D printers as new tools alongside others.

The armed forces of different countries have varying needs, operational environments, and starting points regarding the use of AM as part of logistics. This study contributes to the understanding of logistics, particularly the use of additive manufacturing, in special conditions, even beyond military logistics.

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INTEGRATION OF UNMANNED AIRCRAFT SYSTEMS IN GENERAL AIR TRAFFIC IN PORTUGAL

INTEGRAÇÃO DE SISTEMAS DE AERONAVES NÃO TRIPULADAS NO TRÁFEGO AÉREO GERAL EM PORTUGAL

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Abstract

The integration of Unmanned Aircraft Systems (UAS) into General Air Traffic (GAT) presents complex regulatory, operational, and technological challenges. This study aims to design a conceptual ecosystem model to facilitate UAS integration into Portuguese airspace, ensuring alignment with international best practices. The research methodology combined documentary analysis of international and national literature and semi-structured interviews conducted with subject matter experts. The interviews focused on system, infrastructure, and airspace dimensions.

This analysis identified significant gaps in Portugal's current regulatory strategies, digital platforms, and airspace management, despite partial alignment with European Union Aviation Safety Agency regulations. Based on these findings, a phased ecosystem model is proposed, beginning with the implementation of test zones for U-Space implementation in Lisbon, Porto, Faro, and Funchal, and later expanding to support Urban Air Mobility services nationwide.

The study concludes that the successful integration of UAS into GAT requires a centralized, automated coordination system, strategic infrastructure investment, and formal airspace designation. The proposed model offers a pragmatic and scalable roadmap to overcome existing barriers, contributing to academic knowledge and providing actionable recommendations for policymakers and aviation stakeholders.

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Keywords: UAS Integration; General Air Traffic; Ecosystem Model; U-Space; Airspace Management.

Resumo

A integração de Aeronaves Não Tripuladas (UAS) no Tráfego Aéreo Geral (GAT) apresenta desafios regulatórios, operacionais e tecnológicos complexos. Este estudo visa conceber um modelo de ecossistema conceptual para facilitar a integração de UAS no espaço aéreo português, garantindo o alinhamento com as melhores práticas internacionais. A metodologia de investigação combinou a análise documental de legislação internacional e nacional, com entrevistas semiestruturadas com especialistas na área, estruturadas nas dimensões, sistema, infraestrutura e espaço aéreo.

A análise identificou lacunas significativas nas atuais estratégias regulatórias, plataformas digitais e gestão do espaço aéreo de Portugal, apesar do alinhamento parcial com os regulamentos da European Union Aviation Safety Agency. Com base nestas conclusões, propõe-se um modelo faseado, começando com implementações piloto do U-Space em Lisboa, Porto, Faro e Funchal e, posteriormente, expandindo-se a nível nacional para apoiar os serviços de Mobilidade Aérea Urbana.

O estudo conclui que a integração bem-sucedida de UAS no GAT requer um sistema de coordenação centralizado e automatizado, uma estratégia de investimento nas infraestruturas e formulação do espaço aéreo. O modelo propõe um roteiro pragmático e dimensionável para ultrapassar os constrangimentos existentes, contribuindo para o conhecimento académico e fornecendo recomendações para as autoridades aeronáuticas e para os utilizadores da aviação.

Palavras-chave: *Integração de UAS Tráfego Aéreo Geral; Modelo de Ecossistema; U-Space, Gestão de Espaço Aéreo.*

1. Introduction

“Unmanned systems, particularly autonomous ones, have to be the new normal in ever-increasing areas.”

(Sam LaGrone, 2015)

Unmanned Aircraft Systems (UAS) have evolved significantly in recent decades, expanding from military applications to a wide range of civilian and commercial uses. They were first exposed to the public during the Iraq and Afghanistan conflicts, where systems like the *Global Hawk* provided intelligence, surveillance and reconnaissance, while the *Predator* drone played a key role in ground attack missions (Kopardekar et al., 2016). Since then, UAS have increasingly been used in civilian operations, particularly in disaster response and environmental monitoring, and their market continues to grow. According to The Insight Partners (2023a), the compound annual growth rate of the global UAS industry is projected to reach 8.6% between 2023 and 2028. This rapid expansion aligns with broader trends in

automation and digitalization, enhancing operational capabilities across multiple industries (Rios et al., 2020).

The expansion of UAS into the civilian sector began with agricultural applications and quickly extended into industrial and commercial domains, including package delivery and infrastructure inspection (Jung & Craven, 2020). The market for civil UAS is expected to grow at three times the rate of the military sector (The Insight Partners, 2023b). However, the increased presence of UAS in controlled airspace presents challenges for Air Traffic Management (ATM), particularly near airports, where unauthorized drone incursions have disrupted operations (McTegg et al., 2022). The first mitigation efforts focused on countermeasures such as using trained birds of prey or electronic detection and disruption systems (European Authority for Aviation Safety [EASA], 2021a). Nevertheless, regulatory bodies have emphasized that, rather than restricting UAS operations near controlled airspace, they should be integrated into existing air traffic operations (EASA, 2024; Eurocontrol, 2018; Federal Aviation Administration [FAA], 2022d). Several studies have found that integrating UAS into general air traffic (GAT) requires robust technological frameworks and regulatory adaptations (Legros et al., 2019).

This will require the creation of an operational and technological framework to ensure interoperability between manned aviation and a dedicated Unmanned Traffic Management (UTM) system within the broader ATM environment. As noted by Jung & Craven (2020) and Kopardekar et al. (2016), successful UAS integration depends on UTM systems that guarantee safety and efficiency. While the United States (U.S.) of America and European Union (EU) have made progress through initiatives like Single European Sky (SES) ATM research project SESAR and U-Space (EASA, 2024; Eurocontrol, 2018), Portugal does not currently have a dedicated UTM system. The absence of such an infrastructure highlights the need for a national strategy aligned with European regulations and international best practices (Legros et al., 2019). Addressing these gaps is critical, as studies show that a well-designed ecosystem for UAS integration can significantly enhance operational efficiency and safety in national airspace (Rios et al., 2020).

This study proposes a model for an ecosystem that supports the integration of Unmanned Aircraft Systems (UAS) into General Air Traffic (GAT). The study falls under the domain of Military Sciences and addresses a topic in the field of Military Techniques and Technologies, and, more specifically, within the subfield of Command, Control, Communications, Computers, and Information (C4I).

The study is structured around a general objective (GO) and two specific objectives. The main goal is: to develop a tailored ecosystem model for integrating UAS into GAT in Portugal, drawing comparative insights from both the U.S. and European best practices frameworks. The first specific objective (SO1) is: to analyze and compare the ecosystem models for UAS integration in GAT developed in the U.S. and Europe. SO2 is: to assess the current regulatory, operational, and infrastructural conditions for UAS integration in Portugal.

The research question driving this study is: How can a tailored ecosystem model for integrating UAS into GAT in Portugal be developed by drawing comparative insights from the United States and European best practices frameworks?

To define the scope of the research, temporal, geographical, and subject delimitations were established. Temporally, the study focuses on the period from 2017 to the present (the U-Space concept was introduced in 2017 and should be fully implemented by 2040) (Eurocontrol, 2018). The topic is analyzed in a specific geographical area: the Portuguese airspace. However, due to differing interpretations of what constitutes national airspace jurisdiction (Dempsey & Manoli, 2017), relevant legal frameworks and conventions were consulted to delineate these boundaries within the scope of the study. In terms of subject, the study focuses on both aerial and ground-based systems, identifies necessary changes to existing infrastructure – both interoperable and stand-alone – and addresses the conditions required for the safe and efficient integration of UAS into GAT (EASA, 2024; Rios et al., 2020).

This comprehensive analysis aims to contribute to the creation of a structured and effective integration model for UAS that enhances safety, security, and operational efficiency in Portuguese airspace. At the same time, it seeks to align national efforts with broader European and international initiatives. Building on existing literature on air traffic management and unmanned aviation, the study offers insights that hold value for both military and civilian applications (Jung & Craven, 2020; Legros et al., 2019).

2. Theoretical and conceptual framework

2.1. Literature review

The evolution of ATM has been driven by key historical events and growing aviation demands. The Wright brothers' first powered flight in 1903 marked the beginning of modern aerospace development (Crouch, 2023). As aviation expanded, the need for organized airspace became evident, leading to the establishment of the world's first air traffic control (ATC) body at Croydon Airport in the 1920s (Hooks, 1997). This initiative set a precedent for structured air traffic management worldwide (*One Hundred Years of Flight Service*, 2020). However, it was not until the tragic 1956 mid-air collision over the Grand Canyon, which claimed 128 lives, that a standardized air traffic management system was recognized as essential. The incident highlighted the need to integrate ATC, airspace management, and traffic flow regulation to ensure safer and more efficient air travel (Kopardekar et al., 2016).

As traditional aviation systems matured and expanded, the emergence of innovative platforms such as UAS began to reshape the aerospace landscape. Initially designed for agricultural applications, civilian UAS soon found use in industrial and commercial domains, including tasks like package delivery and collection. This rapid growth in civilian UAS operations represents a significant shift in aviation trends, with their expansion expected to outpace that of military UAS by a considerable margin (The Insight Partners, 2023b).

With this growth in global UAS, UAS incidents have also increased (Leslie, 2023). And, in the same way that it was necessary to implement an ATM service for piloted air traffic, the

unmanned aviation sector would also require an air traffic management service for unmanned aircraft, or UTM service.

Nations all over the world expressed concerns for safety and called for the creation of legislation for using UAS. The International Civil Aviation Organization (ICAO), the FAA, the EASA, and the Joint Authorities for Rulemaking on Unmanned Systems are the main organizations that have begun to develop legislation on UAS and its integration into GAT, in addition to the national Civil Aviation Authorities (CAA).

Like with manned aviation, the ICAO developed the “UAS Model” regulations, parts 101, 102, and 149 (ICAO, 2020a, 2020b, 2020c), as well as Advisory Circulars (AC) and the UTM-A Common Framework with Core Principles for Global Harmonization (ICAO, 2020d), to guide and assist the CAA in implementing and supervising UAS operations. Also worth mentioning is Circular 328 on UAS and their operations, which are being considered for implementation in the U.S. National Airspace System, and Doc. 10019 on Remotely Piloted Aircraft System (RPAS) (ICAO, 2011, 2015, 2017b).

The FAA (2022a), through Part 107-Small Unmanned Aircraft Systems of Regulation 14 “Aeronautics and Space” (of the Code of Federal Regulations), set down rules for the use of small UAS and, together with the National Aeronautics and Space Administration (NASA), defined the UTM (FAA & NASA, 2017) and its concept of operations (FAA, 2020).

After the conception of the UTM, it collaborated with industries from the sector to develop the Low Altitude Authorization and Notification Capability (LAANC) to regulate UAS traffic in the vicinity of airports and prevent airspace violations. This system is currently in use at 732 U.S. airports, allowing users to obtain real-time UAS flight clearance (FAA, 2019, 2022c).

Lieb and Sievers (2024) provide a comparative analysis of the European U-space framework and the U.S. UTM system, highlighting regulatory differences and operational challenges. Similarly, Aposporis (2024) offers a global perspective on the regional frameworks that govern UAS integration into ATM, emphasizing the importance of harmonization efforts. Jepsen et al. (2024) introduce the Airspace Advisory Service, which supports detect-and-avoid capabilities for UAS operators utilizing traffic information systems, a crucial development for operational safety.

Current research on automation and artificial intelligence (AI) is significantly influencing the development of UAS integration frameworks. Schwoch et al. (2024) examine the interactions between ATM and UAS operators in U-space operations, highlighting the role of automation in improving coordination. Kalyanam (2023) investigates the application of AI/ML (machine learning) and natural language processing to optimize ATM and UTM operations. Similarly, Von Mengden et al. (2025) present an automated air traffic control interface concept for advanced air mobility aircraft, in an example of the ongoing efforts to enhance human-machine collaboration in airspace management.

Safety remains a critical consideration in UAS integration. Garcia et al. (2023) propose a safety and security technology ontology for UAS operations, while Teutsch et al. (2023) analyze the impact of UAS contingencies on ATC operations in shared airspace. Additionally,

Hashemi et al. (2023) introduce a novel ATM and control methodology that leverages fault-tolerant autoencoders and blockchain applications for UAS operations. G. Singh et al. (2024) highlight recent trends in the UAS-UTM ecosystem, focusing on key integration challenges, including airspace coordination and risk mitigation strategies.

In Europe, the SESAR Joint Undertaking identified the need for an ecosystem (dubbed U-Space) with a high level of digitalization and automation to allow the safe integration of a large number of UAS in the airspace, especially at low altitudes (SESAR Joint Undertaking, n.d.-b). Several research projects have been, and are being, developed to test various technologies to be applied in U-space (SESAR Joint Undertaking, n.d.-a).

One of them is the CORUS (Concept of Operations for EuRoPean UTM Systems) consortia, which proposed three new classes of airspace, X, Y, and Z, based on the risk of the operation. These new airspace volumes are based on the existence of separation services and the access requirements of small UAS (sUAS – weighing less than 55 pounds) (CORUS, 2019a).

In turn, the EASA published Regulation (EU) 2019/945 (2019), which defines the categories of UAS, and, soon after, Regulation (UE) 2019/947 (2019), which establishes rules and procedures for the operation of UAS. With the publication of a package of three Implementing Regulations (EU) (2021/664, 2021; 2021/665, 2021; 2021/666, 2021) that would enter into force on January 26, 2023, the EASA identified the regulatory framework for U-Space.

Like other nations, Portugal has been adapting its regulatory landscape to accommodate UAS operations. Neto et al. (2024) discuss software training platforms aimed at bridging the gap between UAS, air traffic controllers (ATCo) and the national airspace system. Portugal has implemented ICAO, NATO (North Atlantic Treaty Organization), EASA, and Eurocontrol regulations, publishing specific amendments as needed (Autoridade Nacional da Aviação Civil [ANAC], 2022a). The country is still in the process of defining a National Strategy for U-space implementation to encourage industry investment and engagement.

To improve the safety and coordination of UAS operations in Portugal, the ANAC (ANAC 2020) launched the “Voa na Boa” application. This mobile platform provides real-time UAS flight authorization, interactive airspace maps, and compliance guidance for drone operators. Similar to the U.S. LAANC system, “Voa na Boa” serves as a digital tool to ensure adherence to airspace regulations and to prevent unauthorized UAS activity near sensitive areas (ANAC, 2023). While this represents progress in operational oversight, challenges remain in integrating Portugal’s U-Space infrastructure with broader European frameworks and existing ATM systems.

To overcome those challenges and improve the existing ATM systems, the Portuguese Air Force (PrtAF) and NAV Portugal are exploring shared wide area multilateration (WAM) systems to improve surveillance capabilities (NAV Portugal, 2015; Rodrigues, 2010), but the complexity of integrating UAS into controlled airspace requires further automation and interoperability solutions (Schwoch et al., 2024). However, interoperability concerns remain, as the density of U-space operations could strain ATM infrastructure (Jadhav et al., 2021). Schwoch et al. (2024) highlight potential automation benefits that could address some of these challenges.

One of the main advantages of using and sharing the WAM system is that both organizations already have protocols in place for radar information sharing, facilitating rapid radar visualization of the territory. However, this system has a significant limitation: it is not compatible with other radar systems. This would require the acquisition of additional sensors, making it unfeasible to share the visualization of NAV's existing sensors, leading to higher costs and operational challenges.

Regarding airspace, some challenges must be considered, namely, the capacity of each sector, the necessary routes and approaches, the existing ATC and ATM systems, and the traffic management processes. Furthermore, geographic areas where U-Space can be developed is yet to be defined (Decree-Law no. 87/2021, 2021, p. 8). Airspace classes must be created for U-Space to distinguish the type of operation and services provided, in addition to the mandatory services prescribed by the Implementing Regulation (EU) 2021/664 (2021) and other Regulations.

It is still early to understand the level of interoperability that will be reached, as the sudden integration of the U-Space infrastructure, which will have to support a much higher density of devices than that of manned aviation, could overload the ATM infrastructure to such an extent that it would be impossible to use both (J. Pereira, Head of CNS Coordination Unit at Eurocontrol, online interview, June 2, 2022 and F. Camacho, Head of the Unmanned Aircraft Department at ANAC, online interview, July 18, 2022). However, with the introduction of U-Space airspace in the vicinity of airports, a certain level of interoperability will be required to keep both infrastructures safe.

The analysis of existing literature underscores the ongoing global efforts to integrate UAS into general air traffic (GAT) while balancing safety, efficiency, and regulatory compliance. A comparison between Europe and the U.S. reveals fundamental differences in regulatory structures, technological implementations, and integration strategies. Lieb & Sievers (2024) highlight the divergence between the European U-space framework, which emphasizes structured airspace segmentation, and the U.S. UTM system, which focuses on flexible, demand-driven solutions. Additionally, Aposporis (2024) identifies the need for harmonized frameworks to ensure interoperability across regions.

Portugal's approach to UAS integration reflects broader European regulatory trends, but faces specific national challenges. Neto et al. (2024) highlight the role of software training platforms in bridging gaps between UAS operators and air traffic controllers, but Portugal still lacks a fully defined national U-space strategy. While regulations based on ICAO, NATO, EASA, and Eurocontrol guidelines have been adopted, key challenges persist, particularly in surveillance, airspace management, and industry engagement.

Given these insights, there is a clear need for a comprehensive ecosystem model to facilitate the integration of UAS into GAT in Portugal. Such a model must address regulatory alignment, automation advancements, and operational frameworks to ensure the safe and efficient coexistence of manned and unmanned aviation. Current literature identifies the importance of refining Portugal's U-Space strategy (Kalyanam, 2023), leveraging automation

technologies, and implementing innovative safety solutions (Garcia et al., 2023), as well as enhancing digital platforms such as “Voa na Boa” to streamline UAS operations and regulatory compliance. The development of an adaptable and scalable ecosystem is therefore critical to support the sustainable growth of UAS operations in Portuguese airspace.

2.2. Concepts

This section defines the core concepts relevant to UAS integration into GAT and presents the analysis model guiding the study.

U-Space: refers to a set of new digital services and procedures designed to safely and efficiently integrate UAS into controlled and uncontrolled airspace. Defined primarily by the EASA and operationalized through the SESAR initiatives, U-Space includes services such as network identification, geo-awareness, flight authorization, and dynamic airspace management. The purpose of U-Space is to enable large-scale UAS operations while ensuring safety, security, and respect for existing manned aviation and airspace users (Implementing Regulation [EU] 2021/664, 2021).

Ecosystem: according to the biological definition, an ecosystem is the “set formed by an environment and the living beings that, in normal mutual relationships, occupy that environment; ecological system.” (Porto Editora, n.d.). By analogy, in this study, an ecosystem is understood as the set of systems, infrastructures, and airspace in which UAS will be integrated, as well as how they relate.

System: a set of interdependent components that interact to achieve a common purpose (Chiavenato, 2003, p. 492). This study addresses various aerial and ground systems. For example, an aerial system includes the Communication, Navigation, and Surveillance (CNS) equipment on a UAS that forms a system to keep the UAS in flight. A ground system consists of the operator and Ground Control System, which provide C2 for the UAS.

Infrastructure: the set of elements or services that are considered necessary for an organization to function or for an activity to be developed effectively (Editora Conceitos.com, 2014). In the case of ATM infrastructure, it comprises the integrated air traffic of manned aviation and airspace, including air traffic services, airspace management, and air traffic flow management, ensuring continuous facilities and services in collaboration with all parties involved (ICAO, 2016). In this study, it refers to the equipment and services necessary for the integration of UAS into general air traffic.

Airspace: the mass of air surrounding the Earth’s surface, including land and maritime areas, and the lower boundary of space. The upper boundary is not clearly defined due to various legal and physical considerations (Dempsey et al., 2017). To define the upper boundary in this study, the operational limits of manned and unmanned aircraft are considered: manned aircraft (Concorde) at FL600 (FAA, 1979) and unmanned aircraft (Global Hawk) at FL600 (Northrop Grumman, 2013). The Chicago Convention and the United Nations Convention on the Law of the Sea establish that sovereign airspace corresponds to the land areas and territorial waters of a state (Law no. 34/2006, 2006). Therefore, in this study, national airspace is defined as:

- The lateral limits coincide with the outer boundaries of the Lisbon and Santa Maria Flight Information Regions.
- The ground surface and mean sea level define the lower limit.
- The upper limit is set at FL600 altitude.

2.3. Analysis model

To focus and organize the research, key concepts, dimensions, and indicators were defined, which helped to design the questions used in the semi-structured interviews and guided the documentary analysis. The central research problem addresses the creation of an ecosystem model for integrating UAS into GAT in Portugal, aiming to ensure safety, regulatory compliance, and operational efficiency. The complexity of this task lies in harmonizing technological innovation, infrastructure development, and legal frameworks to enable the safe coexistence of manned and unmanned aviation.

To explore this issue, the main research question was formulated: “How can a tailored ecosystem model for integrating UAS into GAT in Portugal be developed by drawing comparative insights from the United States and European best practices frameworks?”

This question frames the investigation, directing the analysis toward identifying the systems, infrastructures, and regulatory adaptations required for effective UAS integration. The GO of this research is “to develop a tailored ecosystem model for integrating UAS into GAT in Portugal, drawing comparative insights from both the U.S. and European best practices frameworks”. To achieve this GO, the following analysis model was created.

Table 1 – Analysis model.

Specific Objectives	SO1	To analyze and compare the ecosystem models for UAS integration in General Air Traffic developed in the U.S. and Europe		SO2	To assess the current regulatory, operational, and infrastructural conditions for UAS integration in Portugal
Subsidiary Questions (SQ)	SQ1	What are the key similarities and differences between the U.S. and European approaches to UAS integration into GAT, and what lessons can be drawn from them?		SQ2	What is the current state of UAS integration into GAT in Portugal, and what gaps or opportunities exist in the national context?
Concepts	System		Infrastructure		Airspace
Dimensions	Terrestrial	Aerial	Interoperable	Independent	Classification
Indicators	Requirements		Structure		Rules
Data collection techniques	Document analysis Semi-structured interviews				

The analysis model provides the conceptual foundation for developing a comprehensive ecosystem that integrates UAS with manned aircraft within shared airspace classes, including the necessary stakeholders, systems, infrastructures, and regulatory frameworks.

3. Methodology

The study methodology follows the rules and standards established by the Military University Institute (IUM) (Fachada et al., 2022).

The research field analyzed in this paper is UAS, which encompasses the study and development of various aspects related to unmanned aircraft, including design, control, navigation, communication, and sensing technologies, among others, and applications in civil and military domains (Valavanis & Vachtsevanos, 2015).

Considering the research object and objectives, an objectivist approach is deemed the most suitable methodology for studying this topic. Since the objective of this study is to propose a concrete model for the integration of UAS into the GAT, an ontological stance directed towards the study of reality as a concrete and objective structure is required (Santos & Lima, 2019).

The research approach was a deductive reasoning process, which progresses from general ideas to specific conclusions, in this case, by analyzing the situation in the U.S. and the prospects for Europe. Lessons learned from these analyses were then adapted to incorporate best practices for Portugal.

A qualitative research strategy was adopted, utilizing the following data collection methods:

- Semi-structured interviews (Flick, 2005) with recognized experts and specialists to obtain expert knowledge, contribute, and validate the ecosystem model proposed; and
- Reference documentation, including scientific articles and various legislative documents.

A case study research design was employed, as it allows for a thorough analysis of the national case study, aiming to provide a rigorous description of the observation unit (Santos & Lima, 2019).

In the first phase, a literature review (e.g., scholarly articles, legislation, projects, and case studies) was conducted to define the research object, establish objectives, delineate the topic, formulate the research problem, research questions, and the methodological procedure described. The search terms included concepts such as UAS, RPAS, U-Space, UTM, ATM, DAA, and regulations from the FAA and EASA. The initial search returned hundreds to thousands of documents, depending on the database used. Approximately 50 to 100 documents were analyzed in detail, and about 30 to 50 were ultimately used. The selection criteria prioritized documents published within the last 10 years, focusing on peer-reviewed academic articles, official regulatory publications, and technical project reports directly related to UAS integration, U-Space development, or airspace management innovations.

In the second phase, answers to the research questions were obtained through a analysis of documentation issued by the FAA, the EU (European Defense Agency, SESAR, EASA, and Eurocontrol), NATO, and Portugal, complemented by semi-structured interviews.

To enrich the bibliographic research and ensure the relevance of the findings, semi-structured interviews were conducted with 13 key stakeholders from regulatory authorities (Table 2), air navigation service providers, and UAS-related organizations. These interviews were carried out through videoconference, email, and in-person meetings, and served to collect detailed qualitative insights on the practical, regulatory, and technological dimensions of UAS integration into Portuguese airspace. This method enabled a flexible yet structured exploration of expert perspectives, contributing both to the validation of the proposed ecosystem model and to the identification of context-specific challenges that were not evident in the documentary analysis.

Table 2 – List of interviewees.

Name	Function	Affiliation
Rui Silva	Air Traffic Controller	NAV Portugal
Marcos Costa	Head of the Strategy, Planning, and External Relations Office / Strategic Development and External Relations	NAV Portugal
Clélio Ferreira Leite	President	APANT ¹
Fábio Camacho	Head of the Unmanned Aircraft Department	ANAC
Maj Coelho da Silva	Commander of Squadron 991 (Unmanned Aircraft)	PrtAF
Nathalie Hasevoets	EDA Project Officer UAS Certification and ATM Research	EDA
Ross McKenzie	Staff Officer Joint Capability Group UAS	NATO
Stephen Hanson	Secretary of Air Traffic Management Communications, Navigation & Surveillance Advisory Group	NATO
Jorge Pereira	Head of CNS Coordination Unit	Eurocontrol
Edgar Reuber	Head of Civil-Military ATM Coordination	Eurocontrol
Manu Lubrano	CEO and Co-Founder	INVOLI
Joseph Rios	Chief Technologist Aviation Systems Division	NASA
Jessica Ann Orquina	Acting Manager UAS Integration Office / FAA Aviation Safety	FAA

Interview responses were analyzed using Bardin's (2016) content analysis approach, focusing initially on airspace classification and UAS typology to identify key indicators aligned with the analysis model.

The qualitative data obtained from the semi-structured interviews were analyzed through thematic coding. Interview responses were manually organized according to the three analytical dimensions defined in the analysis model: system, infrastructure, and airspace. Key themes and insights were identified by systematically grouping similar responses and aligning them with the predefined indicators outlined in Table 1. This coding process enabled the consistent interpretation of expert opinions and facilitated the validation and enrichment of the conceptual ecosystem model.

¹ Associação Portuguesa de Aeronaves Não Tripuladas (in English, Portuguese Association of Unmanned Aircraft).

4. Presentation of data and analysis of results

This section presents the study's results, based on two primary sources: documentary analysis of international and national regulatory frameworks, technical studies, and institutional publications; and qualitative data obtained through semi-structured interviews with subject matter experts, including representatives from regulatory authorities, air navigation service providers, and UAS operators. The findings are organized according to the dimensions and indicators defined in the analysis model (Table 1): system, infrastructure, and airspace. This approach ensures a systematic interpretation of the data and facilitates answering the subsidiary research questions (SQ1 and SQ2).

4.1. System

The "system" dimension concerns the technological and regulatory platforms supporting UAS integration.

In the U.S., the integration of UAS into GAT has been driven largely by defense-related technological advancements and operational experience in conflict zones such as Iraq and Afghanistan (Bole, 2020; Gross, 2022). This context fostered a proactive regulatory environment where initiatives such as the LAANC system and UTM pilot programs were developed to automate flight authorizations and enable scalable operations (FAA, 2022d). Interviews confirmed that the centralization and automation achieved through the LAANC significantly accelerated UAS access to controlled airspace.

In contrast, Europe has followed a more research-oriented pathway, investing heavily in programs such as ERICA and CORUS to establish comprehensive regulatory and operational frameworks for UAS integration (CORUS, 2019b; SESAR Joint Undertaking, 2019). The European model is set out in a U-Space regulatory package that will be implemented in phases (U1–U4 phases), aiming to achieve high levels of digitalization and automation across the continent (EASA, 2021b). However, interviewees pointed out that the lack of uniform implementation among Member States remains a significant challenge, hindering cross-border drone operations.

In Portugal, national regulations largely align with EASA directives, ensuring mutual recognition of UAS certifications, pilot competencies, and operational authorizations within the EU (ANAC, n.d.). Nevertheless, the interviews revealed that the absence of a comprehensive National UAS Strategy has delayed the proactive development of supporting systems such as a centralized UTM or U-Space platform. Currently, Portugal relies on basic platforms like "Voa na Boa" (ANAC, 2020), which fall short of providing the dynamic flight planning and real-time coordination necessary for advanced UAS operations.

4.2. Infrastructure

The infrastructure dimension refers to the physical and digital networks required for safe UAS operations.

In the U.S., robust investments in communication, navigation, and surveillance infrastructures were made early to support UAS operations, enabling the reliable execution of BVLOS (Beyond Visual Line of Sight) missions (FAA, 2022b). The systematic integration of these technologies into existing ATM frameworks provided a solid foundation for scaling operations.

Europe, by contrast, adopted a phased and fragmented approach to infrastructure development linked to the U-Space implementation stages (EASA, 2021b). Research projects such as CORUS highlighted the need for scalable, interoperable ground infrastructures, but also revealed that Member States vary considerably in terms of readiness (CORUS, 2019b).

Portugal has also adopted this fragmented approach. Interviews with national stakeholders highlighted that, beyond regulatory compliance, there is a substantial gap in physical infrastructures, such as ground-based DAA systems, interoperable C2 networks, and dynamic airspace management tools. Unlike Spain, which has adopted a proactive, public-service-oriented U-Space deployment strategy (Ministerio de Transportes, 2018, 2022), Portugal has so far taken a reactive stance, implementing services only in response to operator demands rather than through a strategic infrastructure plan. Similar cautious approaches are found in France, Germany, and Italy, reflecting a broader European trend (Martín-Lammerding et al., 2022).

4.3. Airspace

The airspace dimension concerns the legal and operational structures that manage risk and define access for UAS.

In the U.S., airspace access for UAS was enabled primarily through standardized national rules supported by the LAANC, which made it possible to conduct low-risk drone operations in controlled airspace below 400 feet (FAA, 2022d). This approach simplified operator procedures and created a predictable operational environment.

In Europe, airspace is structured by establishing U-Space zones based on operational complexity and risk management criteria (EASA, 2021b). However, as noted by interviewees, inconsistencies between Member States in defining these zones present serious challenges to operational predictability and cross-border interoperability.

In Portugal, although legally aligned with EASA's framework, no official U-Space zones have been designated. National regulatory authorities maintain a reactive approach to airspace segmentation, pending operational demand. This has created uncertainty for UAS operators seeking to engage in more complex operations, such as BVLOS missions and Urban Air Mobility (UAM) initiatives. The case study of Squadron 991 (E991) of the PrtAF reflects this limitation: while operationally ready and equipped with UAS capabilities, its missions are constrained by the absence of clearly defined airspace structures for unmanned operations, which increases mission planning complexity and administrative burden.

4.4. Brief overview: lessons learned

This section addresses the two subsidiary questions:

- SQ1: What are the key similarities and differences between the U.S. and European

- approaches to UAS integration into GAT, and what lessons can be drawn from them?
- SQ2: What is the current state of UAS integration into GAT in Portugal, and what gaps or opportunities exist in the national context?

Regarding SQ1, the findings presented in Sections 4.1 to 4.3 show that Portugal is still in an early phase of UAS integration into GAT. While national regulations are harmonized with the EASA framework, key structural gaps remain:

- System-level gaps include the absence of a comprehensive National UAS Strategy and the lack of a centralized UTM/U-Space platform, limiting automation and dynamic airspace coordination;
- Infrastructure gaps are evident in the lack of interoperable communication, surveillance, and ground-based detect-and-avoid systems required for BVLOS and Urban Air Mobility operations;
- Airspace management remains reactive, with no designated U-Space zones, increasing uncertainty as well as the administrative burden of complex missions.
- Nonetheless, Portugal has opportunities to leapfrog ahead by:
- Learning from more mature UAS implementations in Europe (e.g., Spain) and the U.S;
- Leveraging existing regulatory alignment with the EASA;
- Taking a proactive stance in infrastructure and digital service development to enable scalable, safe UAS operations.

As for SQ2, a comparative analysis of the U.S. and European frameworks revealed key insights:

- The U.S. model is centralized, regulator-driven, and focused on automation and national standardization, with operational tools such as the LAANC enabling low-friction airspace access;
- Europe uses a phased, research-led model (U-Space U1–U4) aimed at harmonizing across diverse national systems, but implementation varies significantly across countries;
- Both regions emphasize automation, interoperability, and digital services, but Europe must deal with challenges due to institutional fragmentation.

The Portuguese ecosystem can benefit from both (the U.S. focus on centralized services and Europe's structured regulatory roadmap) by adapting these strategies to its institutional and operational realities.

These insights underpin the following strategic priorities for Portugal:

- Establish a centralized, automated digital platform (System dimension);
- Invest in interoperable infrastructure to support BVLOS and UAM operations (Infrastructure dimension);
- Designate U-Space zones with a clear, risk-based operational framework (Airspace dimension).

These findings serve as the foundation for the ecosystem model proposed in the next chapter, ensuring that the identified gaps, opportunities, and international best practices inform the proposed solution.

5. Ecosystem proposal for Portugal

Building on the analysis of the system, infrastructure, and airspace dimensions presented in the previous section, this chapter proposes a conceptual ecosystem model designed to address the critical challenges identified for UAS integration into GAT in Portugal.

5.1. Current state vs implementation needs

To facilitate the implementation of the proposed ecosystem model, it is essential to distinguish between the components that already exist in Portugal and those that must still be developed.

Table 3 summarizes the current implementation status of each key component of the proposed ecosystem model, highlighting what is already operational in Portugal and what remains to be developed to ensure full integration of UAS into GAT.

Table 3 – Current Status and Implementation Needs for the Portuguese UAS Ecosystem.

Aspect	Status	Action Needed
Regulatory Alignment with EASA	In place	Strengthen U-Space regulation with national strategy
“Voa na Boa” UAS Registration Platform	Exists	Upgrade to real-time U-Space coordination
WAM, SSR	Partially exists	Integrate UAS visibility into ATM systems
UAS Operations (e.g., Squadron 991)	Exists (limited)	Expand to BVLOS and integrate with civil ATM
UACS Platform	Not yet implemented	Develop and deploy UACS nationwide
U-Space Airspace Designation	Not yet implemented	Define U-Space zones and airspace classes
Public Reporting and Conspicuity Standards	Incomplete	Publish standards for public involvement and mandatory conspicuity
Mobile Network Support for UAS	Urban areas	Assess and expand capacity for dense UAS operations

5.2. Model components

The proposed ecosystem model is composed of several key entities whose coordinated interactions are essential to ensure the safe and efficient integration of UAS into GAT in Portugal. Table 4 outlines the main stakeholders and their respective responsibilities within the model, including regulatory bodies, service providers, infrastructures, and UAS operators.

Table 4 – Model Components.

Entities	Systems	Infrastructures	Airspace
ANAC	Conspicuity	Mobile networks	ATM
AAN			
NAV			
PrtAF			
SFS ³	DAA	SSR ² /WAM	U-Space
CISP ⁴		USSP architecture	
USSP ⁵			
USS ⁶	UACS		
UAS operators			
Population			

Figure 1 illustrates the proposal for U-Space Authorization and Coordination System (UACS), a digital platform that forms the technological backbone of the proposed ecosystem model. It supports real-time data sharing, flight coordination, and communication between UAS operators and air traffic stakeholders, contributing directly to the development of the operational UAS ecosystem in Portugal.

² Secondary Surveillance Radar.

³ Security Forces and Services.

⁴ Common Information Services Provider.

⁵ U-Space Service Provider.

⁶ UAS Service Suppliers.

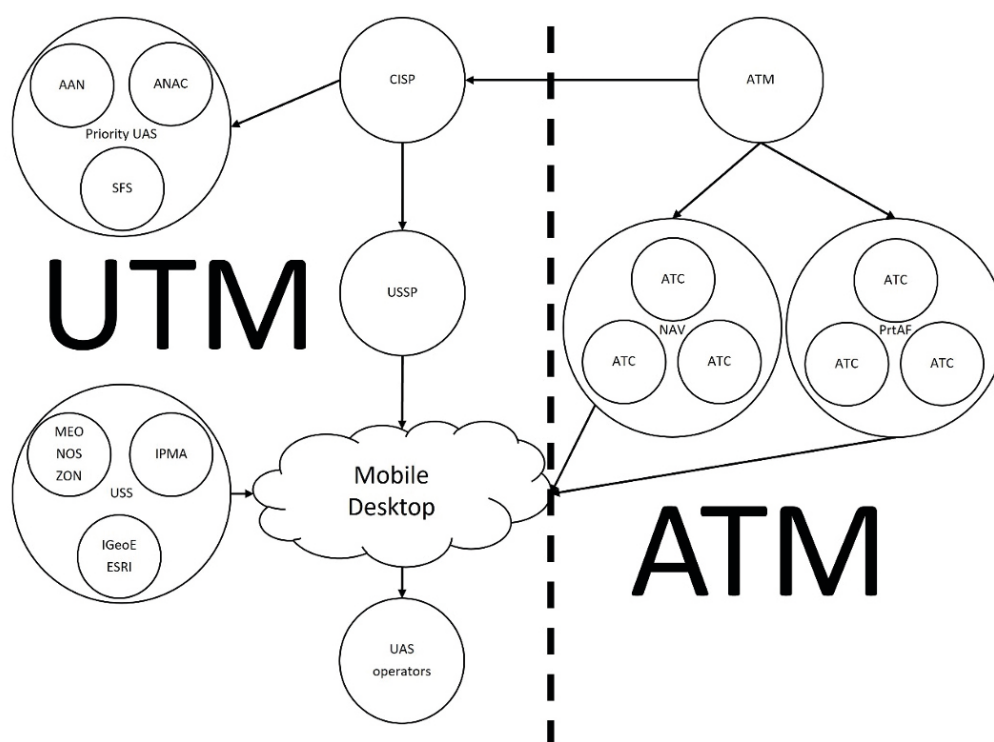


Figure 1 – Proposal for U-Space Authorization and Coordination System (UACS).

Source: (Loureço, 2023).

As the use of UAS continues to expand, integrating drones safely into shared airspace has become a critical challenge. The proposed ecosystem model offers a blueprint for managing this integration in a structured way, facilitating coordination between unmanned and manned aviation. Its digital foundation, particularly the UACS, enhances adaptability and scalability, allowing the model to evolve into a mature UAS operational ecosystem over time.

Building on the regulatory framework characterized in Section 4.2, the proposed ecosystem model defines the roles and interactions of key entities essential for the safe integration of UAS into Portuguese airspace.

Regulatory bodies such as the AAN, the ANAC, and the SFS are some of the most influential entities in this ecosystem. These organizations define the legal framework governing both manned and unmanned aviation. Their responsibilities range from certifying UAS operators and enforcing safety protocols to monitoring compliance and managing airspace restrictions. Without these regulatory bodies, the integration of drones into controlled airspace would lack the necessary oversight to prevent risks and conflicts.

To facilitate real-time coordination and data sharing within the proposed ecosystem model, the CISP is envisioned as a central hub for exchanging critical airspace information.

The CISP would act as an intermediary between UAS operators, USSPs, and air traffic management authorities in this framework. The CISP would ensure that all stakeholders operate with the most accurate and up-to-date information by continuously updating airspace restrictions, traffic conditions, and other operational data. This seamless exchange is essential for maintaining situational awareness, reducing conflicts, and enhancing the overall safety of drone operations.

A key component of the U-Space system is the USSP, which offers specialized air traffic management services tailored to drones. These providers enable safe and automated UAS operations by handling flight authorization, conflict detection, and real-time tracking of unmanned aircraft. By working closely with the CISP, USSPs integrate drone activity into the broader airspace management system, ensuring that UAS missions are conducted in compliance with regulations and in harmony with manned aviation.

Directly supporting drone operators is the UAS Service Supplier (USS), which includes organizations such as telecommunications providers (e.g., MEO, NOS, and ZON), meteorological services (e.g., IPMA), and georeferencing companies (e.g., ESRI and CIGeoE). Mobile telecommunications networks are another key infrastructure for sUAS, as they provide connectivity that covers most urban areas – where drone operations are expected to be most concentrated (F. Camacho, *op. cit.*). However, with the increase in sUAS operations in urban environments and the expansion of U-Space, USSPs must assess whether existing telecommunications networks can handle the increased demand in urban airspace (C. F. Leite, Chairman of the Portuguese Unmanned Aircraft Association, online interview, June 18, 2022, *op. cit.*). If network capacity proves insufficient, alternative solutions such as strengthened signal coverage or Global Navigation Satellite Systems (GNSS) must be implemented (Koumaras et al., 2021; Modi et al., 2021).

These entities provide essential operational services such as flight planning, compliance verification, and communication with ATC. Acting as a bridge between UAS operators and the U-Space infrastructure, USSs play a vital role in ensuring that drones operate safely, efficiently, and within legal boundaries.

Additionally, sUAS capable of interacting with the manned aviation CNS infrastructure – including SSR and WAM surveillance assets – should integrate with these systems to enhance visibility and situational awareness for ATC (M. Costa, Head of Strategy, Planning and External Relations Office of NAV Portugal, online interview, June 14, 2022). This will allow ATC to track and manage drone operations more effectively, ensuring safer interactions between manned and unmanned aircraft.

Meanwhile, the ATM system, along with ATC service providers (NAV Portugal and the PrtAF), oversees the coordination of both manned and unmanned flights. NAV Portugal is responsible for general air traffic control, while the PrtAF manages operations in military airspace. These entities work together to prevent conflicts, enforce regulations, and ensure smooth operations for all airspace users.

At the core of this system are the UAS operators, who rely on these interconnected services to conduct their missions safely. Whether flying for commercial, industrial, or recreational purposes, operators must adhere to airspace regulations, coordinate with service providers, and maintain situational awareness to avoid conflicts with other airspace users. Their ability to access real-time data, obtain the necessary authorizations, and integrate with ATC services is crucial to ensure safe and efficient UAS operations.

Based on the model presented by the CORUS (CORUS, 2019a), new classes of airspace should be proposed for U-Space, namely, to disentangle the types of operations and services provided, classified by level of risk, as shown in Table 5, in addition to the mandatory services prescribed by the Implementing Regulation (EU) 2021/664 (2021) and other Regulations.

Table 5 – Proposed U-Space airspace classes.

Class	Category	Operation type	Separation	Service provided	Mandatory flight plan
UA	Certified	Autonomous	Strategic and autonomous separation		Yes
UB		BVLOS and IFR	Yes	Strategic and tactical separation	Yes
UC		BVLOS and IFR	Yes	Strategic and tactical separation and traffic information	Yes
		VLOS ⁷ and VFR	Yes		Yes
UD	Specific	BVLOS and IFR	Yes	Strategic and tactical separation between (btn) BVLOS/BVLOS and btn BVLOS/VLOS and traffic information	Yes
		VLOS and VFR	No		Yes
UE	Open	BVLOS and IFR	Yes	Strategic and tactical separation btn BVLOS/ BVLOS and traffic information when possible	Yes
		VLOS and VFR	No		No
UF	Open	BVLOS and IFR	No	Traffic information when possible	Yes
		VLOS and VFR	No		No
UG	Open	VLOS and VFR	No		No

Source: (Lourenço, 2023).

Manned air traffic that needs to use U-Space will have to be conspicuous and obtain the same authorizations that are required for UAS. In addition, separations will also be made between manned and unmanned aviation, as in the existing airspace classes (F. Camacho, *op. cit.*).⁷

According to the North American model, the creation of U-Space in the vicinity of airports must account for the limits of conical surfaces, prohibited flight areas (through geofences), and the upper limits permitted in each flight sector (Figure 2), and this information must be synchronized with the entire USSP infrastructure with the UACS.

⁷ Visual Line-Of-Sight.

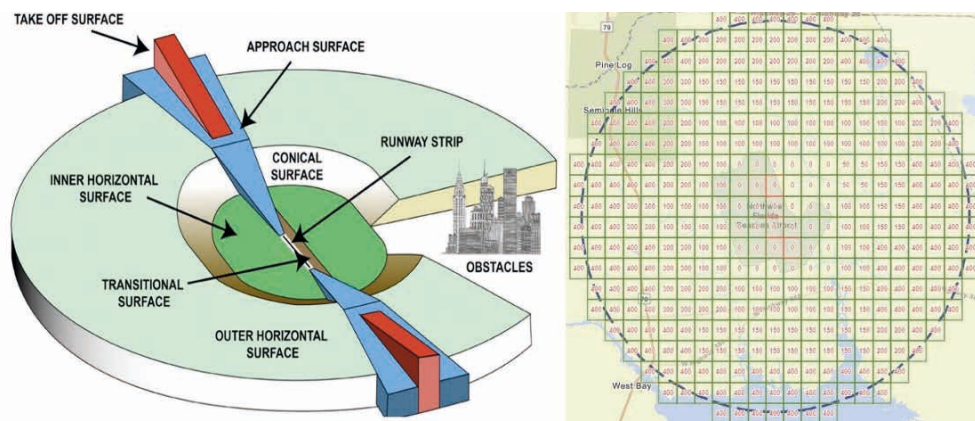


Figure 2 – Clearance area and flight sectors in the vicinity of an airport.

Source: (FAA & ESRI, n.d.; ICAO, 2017a)

Taking Spain as a reference, the U-Space framework incorporates multiple regulatory and operational stakeholders. In the Spanish model, aeronautical authorities such as the AAN (Law no. 28/2013, 2013) and the ANAC (2022b) are responsible for issuing SAL and OA, respectively. These authorizations are essential for UAS operations in GAT, enabling incident recording, investigation, and airspace classification.

Supporting these regulatory bodies, the SFS system plays a critical role in monitoring UAS activities. Drawing from the North American model, the SFS is tasked with reporting unauthorized or hazardous drone operations to the aeronautical authorities, ensuring regulatory enforcement through UA identification. Additionally, the public is encouraged to report any incidents or potential privacy infringements caused by UAS.

A parallel structure is envisioned for Portugal. NAV Portugal, as the designated provider of civil air traffic services (NAV Portugal, 2024, p. GEN 3.3-1), is recognized by ANAC as the “single common information services provider” (R. Silva, *op. cit.*) under Implementing Regulation (EU) 2021/665, 2021. Consequently, the Common Information Services Provider (CISP) model should adopt a centralized approach (Figure 3), at least in the initial phase, to ensure a streamlined transition to the new infrastructure while maintaining operational continuity (Martin et al., 2022).

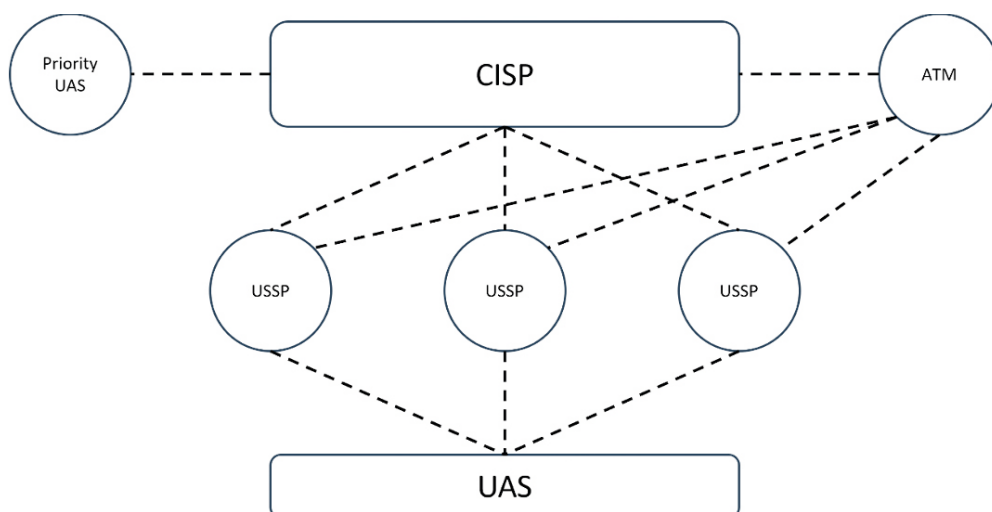


Figure 3 – Centralized CISP model.

Source: (Lourenço, 2023).

NAV Portugal, (2022b) also plays a dual role as a USSP, extending some of its existing services from manned aviation to unmanned operations. These services include aeronautical information through Notices to Airmen (NOTAMs), airspace reservation management, flight plan (FPL) reception, and UAS Volume Reservation (UVR) dissemination.

Similar to other international models, USSPs are responsible for both providing and overseeing the services delivered to UAS operators. They also facilitate coordination between UAS operators and ATC, whether managed by NAV Portugal or the PrtAF. Based on the LAANC model, USS functionalities may be provided either by USSPs or by existing service providers. This includes organizations such as the IPMA for meteorological services, telecommunications operators (MEO, NOS, and Vodafone) for network coverage, and cartographic service providers like CIGeoE and ESRI.

UAS operators form the core user base of this ecosystem, requiring access to various services, including:

Registration of the UAS with the AAN or the ANAC, depending on whether it is a military or civilian platform;

- Aeronautical information for pre-flight and in-flight planning;
- Submission of flight plans or operation plans;
- USSP authorization to enter designated airspace;
- Access to flight information, control, and meteorological services.

For manned aircraft requiring transit through U-Space, coordination is managed via ATC authorities, which in turn liaise with USSPs. Similarly, UAS operators seeking to exit U-Space must coordinate their flight plans through the USSPs, ensuring seamless integration with conventional ATC services.

Although military and state aircraft operations are exempt from U-Space regulations, any entry into this airspace necessitates compliance with GAT protocols. The only exception occurs during priority missions, in which these aircraft have precedence over other traffic.

This entire ecosystem is underpinned by the UACS, which enables real-time operational management. Figure 4 graphically represents the interactions among all entities within the conceptual framework. It maps how stakeholders interact and how services are coordinated to maintain safe and effective UAS operations. It also highlights the relationship between various U-Space airspaces, both contiguous and separate, as well as their characteristics, such as altitudes, classifications, and service provisions.

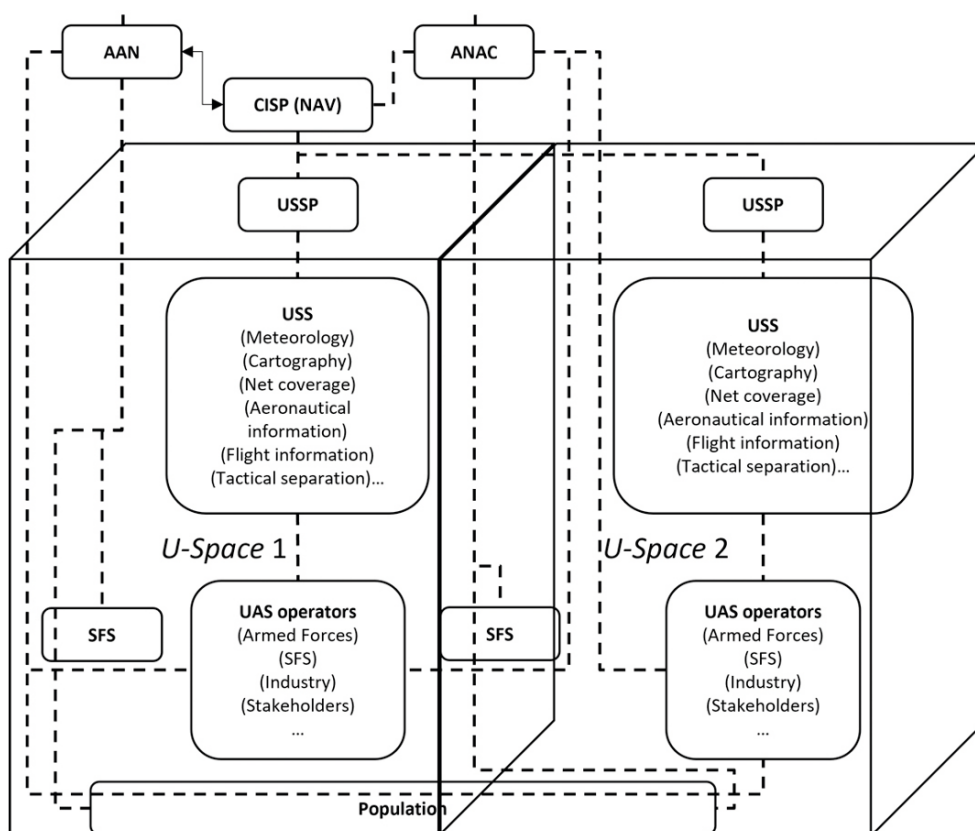


Figure 4 – Proposed U-Space ecosystem model.

Source: (Lourenço, 2023).

By clarifying the roles of each stakeholder and the infrastructure requirements, the proposed ecosystem model serves not only as a planning tool but also as a foundation for implementing a real-world UAS integration ecosystem that aligns with international best practices and Portuguese regulatory needs.

The flowchart in Figure 5 outlines the procedural flow for UAS operators, based on the ecosystem model, showing, step-by-step, how missions should be authorized, coordinated, and integrated into existing ATM systems.

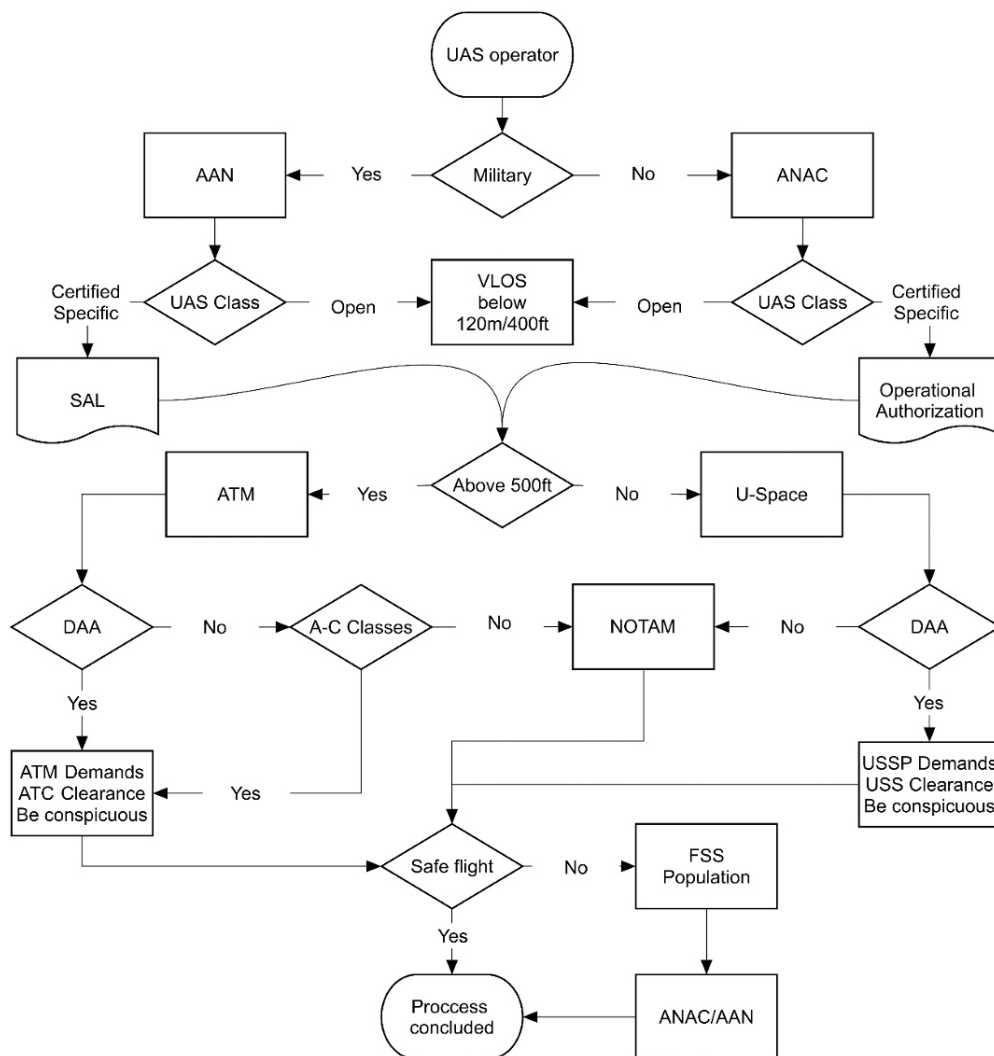


Figure 5 – Proposed Integration of UAS in GAT.

Source: (Lourenço, 2023).

5.3. Phased implementation strategy

To facilitate the effective adoption of the ecosystem model, a phased implementation strategy is proposed. This approach allows for initial operational validation in selected U-Space zones, beginning with trial locations, as explained by R. Silva, ATCo at NAV Portugal

(online interview, June 5, 2022), which would later be expanded to other regions to support the development of UAM, following the North American example.

The key stages of this phased deployment are summarized in Table 6, illustrating the operational scope and objectives of each phase.

Table 6 – Phase 1 and Phase 2 summary.

Phase	Location	Action	Objective
1	Lisbon, Porto, Faro and Funchal	Implement initial U-Space services and validate operational procedures	Test interoperability, stakeholder coordination, and technology in a controlled environment
2	Nationwide (all Portuguese airspace)	Expand U-Space services across the country	Achieve full integration of UAS into GAT, enabling BVLOS and UAM operations

Phased implementation mitigates operational and regulatory risks by allowing new procedures and technologies to be validated in a controlled environment before national deployment. Initial U-Space operations in Lisbon, Porto, Faro, and Funchal provide diverse operational scenarios, including urban density, airport proximity, and maritime contexts, enabling comprehensive testing of interoperability, communication reliability, and safety protocols.

The initial phase is expected to reveal critical technical and regulatory challenges, informing necessary adaptations before expanding the ecosystem nationwide. This strategy enables incremental capacity building among regulatory authorities, service providers, and UAS operators, reducing the risk of systemic failures and increasing acceptance from manned aviation stakeholders.

As for the study's main research question, this phased strategy operationalizes a tailored ecosystem model for Portugal by synthesizing best practices from the United States – such as centralized automation and phased airspace access (e.g., LAANC) – and Europe – such as the U-Space framework and the definition of zones based on risk. By combining centralized digital coordination, investment in interoperable infrastructure, and gradual U-Space deployment, the model provides a scalable, safe, and context-sensitive pathway to UAS integration into GAT.

The proposed ecosystem model offers a structured, phased approach to the integration of UAS into GAT in Portugal. By clearly defining stakeholder responsibilities and establishing a realistic implementation roadmap, the model addresses current operational, infrastructural, and regulatory gaps. The phased strategy ensures that integration progresses incrementally, allowing for continuous validation, adaptation, and alignment with international best practices.

6. Conclusions

This study set out to answer the main research question: “How can a tailored ecosystem model for integrating UAS into GAT in Portugal be developed by drawing comparative insights from the United States and European best practices frameworks?” To answer this question, the study used a qualitative strategy combining documentary analysis and semi-

structured interviews with key stakeholders and industry experts. Using this approach, a conceptual ecosystem model was developed with three critical dimensions: system, infrastructure, and airspace.

Grounded in an objectivist perspective and guided by deductive reasoning, the study critically assessed regulatory and operational approaches in both the U.S. and Europe. From the U.S., the model draws lessons on automation, scalability, and phased implementation – particularly the use of systems like the LAANC and the emphasis on BVLOS operations. From the European framework, it incorporates structured regulatory oversight, the definition of U-Space zones, and digital coordination systems. These comparative insights were synthesized to propose a model tailored to Portugal's unique operational and regulatory environment.

The resulting ecosystem model addresses key national gaps and proposes a phased implementation strategy. Phase 1 prioritizes operational validation within designated U-Space zones in Lisbon, Porto, Faro, and Funchal, enabling localized testing and stakeholder coordination. Phase 2 expands the model nationwide, enabling broader deployment of UAS operations, including BVLOS and potential UAM services. By clarifying stakeholder responsibilities, infrastructure requirements, and operational frameworks, the model provides a structured, adaptive roadmap for the integration of UAS into Portuguese GAT, aligned with international best practices.

This research contributes to the academic and operational discourse by offering a pragmatic model that balances regulatory feasibility with technological readiness. While it is tailored to Portugal, the underlying principles – phased deployment, risk-based airspace management, and collaborative governance – are broadly applicable to similar regulatory contexts.

Nonetheless, the study presents limitations. The proposed model has not yet been validated through live operational trials, and it relies on assumptions regarding regulatory responsiveness and interagency collaboration that must be empirically tested. Furthermore, the economic feasibility of implementing the ecosystem model was beyond the scope of this research and should be explored in future studies that focus on cost structures, funding mechanisms, and return on investment.

Future research should focus on the operational testing of U-Space test zones, the integration of BVLOS and UAM services, and the certification of critical support technologies such as DAA systems. Additionally, economic modeling and stakeholder engagement strategies will be essential for moving from conceptual design to operational deployment.

As the aviation landscape continues to evolve, the integration of UAS into national airspace will require not only technological innovation but also regulatory adaptability and stakeholder alignment. The model proposed in this study offers a structured, phased path forward for Portugal – one that is informed by international best practices yet responsive to local needs. With continued research, stakeholder engagement, and regulatory commitment, Portugal can lead a safe and scalable transformation toward integrated, future-ready airspace operations.

Portugal now stands at a pivotal moment: by embracing a phased, collaborative, and innovation-driven approach to UAS integration, it can become a benchmark for safe, scalable, and future-ready airspace transformation, not just nationally, but across Europe.

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