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IZZIVI IN PERSPEKTIVE V URBANEM BOJEVANJU: ANALITIČNI OKVIR

CHALLENGES AND PROSPECTS IN URBAN WARFARE: AN ANALYTICAL FRAMEWORK

Povzetek Število prebivalcev v mestih po svetu se bo v naslednjih desetletjih povečalo. Konvencionalne vojaške sile se bodo v večji meri uporabljale na omejenih območjih, kjer njihove visokotehnološke zmogljivosti ne prinašajo prednosti. Ta raziskava zagotavlja analitični okvir za razumevanje glavnih izzivov urbanega bojevanja za konvencionalne sile. Analiza kot ključne dejavnike opredeljuje vojaško organizacijsko razsežnost, tehnologije z dvojno rabo, ki spreminjajo pravila bojevanja, in vlogo civilnega prebivalstva v urbanih okoljih. Ugotovitve podajajo nekatera priporočila v zvezi s strategijami usposabljanja in komuniciranja. Perspektive urbanega bojevanja bo zaznamovala kombinacija kognitivnih in kinetičnih ukrepov.

Ključne besede *Urbano bojevanje, vojaške organizacije, vojaške operacije.*

Abstract The population living in cities around the world will increase in the next decades. Conventional military forces will deploy more in constrained areas where their high-tech capabilities are not an advantage. This research provides an analytical framework for understanding the main challenges of urban warfare for conventional forces. The analysis identifies the military organizational dimension, dual-use technologies as game changers, and the role of civilian population in urban environments as key factors. The conclusions provide some policy recommendations concerning training and communication strategies. The prospects of urban warfare will be defined by a combination of cognitive and kinetic actions.

Key words *Urban warfare, military organizations, military operations.*

Introduction Urbanization has been identified as a key megatrend for future warfare (Stringer et al, 2023), due to a likely increase of 2.5 billion people in densely populated areas by 2050 (UN DESA, 2018). Uncontrollable urban growth could provoke a governmental failure in providing basic services, which could be used by armed groups to implement revisionist agendas (US Army, 2014). Prospective analysis has shown a clear tendency towards the concentration of the population in large urban areas (DCDC, 2016), which will identify cities as one of the main operational environments. Economic development in the global south has contributed to the urbanization process, which has implications in the social, political and military dimensions (Konaev, 2019).

Cities and metropolitan areas are relevant spaces for economic development and productive sectors, as there is a high concentration of industry, business and institutional headquarters (Sampaio, 2016). However, despite the positive outcomes of urbanization, it can also contribute to increasing violence and political instability due to state fragility or economic crisis (Rosenau, 1997). Urban areas are defined by their density, as they concentrate heterogeneous and diverse groups with different ideological or ethnic affiliations (Elfversson et al., 2023). These elements reinforce the role of urban populated areas as potential targets for military operations, and their size increases operational complexity.

The academic literature with regard to urban warfare also identifies confrontations between different violent actors. Among the vast number of actors involved, there have been recent conflicts between conventional militaries and non-state actors in Aleppo and Raqqa in Syria, high-intensity terrorist activities in Paris, France, and military operations against organized crime in Rio (Brazil) or Tijuana (Mexico) (Konaev, 2019). Due to the complexity and relevance of urban terrain for military operations, specialized literature in military affairs has identified the main implications for the success and failure of operations.

Because of this, it is relevant to ask: What are the main challenges of urban warfare for conventional military forces? This article provides a qualitative analysis of relevant trends in the deployment of conventional military forces in urban environments. The aim of the research is to focus on the offensive approach, as it allows the proposal of policy recommendations for military forces. The analysis provides a research framework which analyzes the main implications at the organizational level, the impact of double-use technologies, and the role of the civilian population in the operational environment. This study does not analyze specific case studies, instead focusing on general trends which can be extrapolated in further research. The conclusion includes further research on urban warfare, as well as policy recommendations from a political science perspective.

1 ANALYZING MILITARY FORCES IN URBAN WARFARE

Urban warfare is not a new phenomenon, as throughout the 20th Century there have been significant conflicts in urban areas, including in the Spanish Civil War and in the Sino-Japanese War, acquiring a larger dimension throughout World War II. Some self-determination projects during decolonization also involved urban warfare operations in Algeria and Indochina, as well as counterinsurgency activities in Northern Ireland (Konaev, 2019). As the end of the Cold War changed the logics of contemporary conflicts, some systematic violent intra-state actions occurred in cities such as Sarajevo and Mostar (Bosnia and Herzegovina) during the Balkan War (Kaldor, 1999), and in Grozny (Chechnya) and Mogadishu (Somalia) (Rossenau, 1997). Later experiences evidenced the relevance of cities to conventional militaries, including the US operations in Baghdad and Fallujah in Iraq between 2003 and 2011 (Konaev, 2019).

Some of the most recent urban operations have been defined by the conflict between conventional and non-conventional forces, as occurred in Aleppo (Syria), Mosul (Iraq) and Donetsk (Ukraine) (Sampaio, 2016; Bin Inam & Rauf, 2024), as well as in Sanaa (Yemen) or Raqqa (Syria) (Konaev, 2019). Due to the constant presence of a civilian population, conventional forces have limited operational alternatives, being constrained to avoid collateral damage and civilian casualties (Hahn & Jezior, 1999). The characteristics of the urban environment have implied high levels of violence against combatants and non-combatants, affecting both people and infrastructure (Sampaio, 2016).

This research provides an analytical framework for studying the challenges and prospects of conventional forces in urban warfare from an offensive approach. This perspective limits the available options, as providing the analysis from a defensive approach against a foreign adversary would imply multiple alternatives conditioned by the specific characteristics of each case. The research design is structured in several qualitative categories, the main category being the challenges of urban warfare for conventional military forces. This analytical category is further subdivided into the following core categories: (1) The organizational dimension, (2) Dual-use technologies and (3) The role of the local population.

The analysis is structured around the core categories, divided into sub-categories according to the main challenges posed for military forces. The specific characteristics of the urban environment conditions the command and control structures, as well as requiring a high level of mobility and interoperability of forces, due to the need to conduct combined operations. The presence of violent non-state actors in urban environments increases the relevance of dual-use technologies, especially those employed for surveillance and reconnaissance, and those communication and information technologies with impact in the cognitive domain. The presence of the local population in urban warfare poses challenges related to targeting, as well as a high level of incertitude with regard to local support for violent actors. The

availability of information technologies for the local population also has an impact on the cognitive domain, which is taken into account in the analysis.

Table 1:
Research
design
(Source:
Authors)

Main Category	Core categories	Sub-categories
The challenges of urban warfare for conventional military forces	The organizational dimension	Command & Control Mobility & tempo Interoperability of forces
	Dual-use technologies	Surveillance & Reconnaissance The cognitive domain
	The role of the local population	Risks of targeting Support to local actors The cognitive domain

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2 THE CHALLENGES OF URBAN WARFARE FOR CONVENTIONAL MILITARY FORCES

The deployment of forces in urban environments implies several challenges that are analyzed in the following section. According to the research design, the first section discusses the challenges related to the organizational dimension; the second section analyzes the implications of dual-use technologies; and the final section focuses on the role of the local population and their potential impact on military operations. As fighting in cities provides several advantages to the defenders against the attacking force, especially when engaging in combat in the streets (Stone, 2009), initiative and

technological capabilities are limited for the attackers (Hahn & Jezior, 1999). This can be explained by an asymmetry of intelligence, as the defenders have a better knowledge of the streets and rooftops, which is even more important in the case of operations in shanty towns without formal maps (Rossenau, 1997).

2.1 The organizational dimension: small teams and combined operations

Military operations in urban areas are defined by a complexity and multiplicity of elements. In order to achieve operational objectives, armies require combatant awareness and readiness to deploy in complex environments under stress. As Khan & Romaniuk (2023) state, the complexity of the operational environment is defined by the multidimensionality of the physical spaces, involving underground, surface and vertical actions. The urban environment is composed of multiple micro-environments which require tempo, intensity and decentralization of command (Konaev, 2019; Rossenau, 1997). In addition to the physical features, deployed armies must take into account the presence of additional actors and informal networks in a local environment connected to the global arena (Khan & Romaniuk, 2023). The presence of additional actors can sometimes lead not only to fighting against but also to cooperating with local actors when conducting urban operations (Stringer et al., 2023).

The characteristics of urban environments make it difficult to deploy large formations of troops, which implies the division of units into smaller groups and also the decentralization of operations. These facts increase the relevance of low-echelon leadership and command, especially at the company and platoon levels (Rossenau, 1997). Different experiences in urban warfare show how the achievement of objectives is conditioned by small-unit leadership, specialized equipment, and the quality of intelligence (Konaev, 2019). The success of urban operations is based on the degree of training and the operational experience of small units.

When military organizations are deployed in urban areas, armies must take into account the lethality and mobility of the units, the survivability of their troops, and the logistic sustainability of the military equipment (Hahn & Jezior, 1999). This means that the more complex the operational environment, the higher the range of options for combatants there should be, and both the tactics and the rules of engagement must be clear (Niksch, 2017). The achievement of these requirements is essential in order to limit operational mistakes and unexpected outcomes.

With regard to the different types of objectives, conventional armies usually carry out a diverse range of functions in the urban environment. Within the different possibilities, the literature identifies policing operations, raids to evacuate hostages, and sustained military combat against irregular forces defending the city (Bin Inam & Rauf, 2024). Urban warfare requires armies to develop the ability to conduct combined operations. In this sense, a modern military must combine light infantry and mechanized and armoured units (Konaev, 2019); it is essential that light infantry

support armoured units to prevent ambushes and clashes (Rosenau, 1997). Due to the high density of urban terrain, both special operation forces and snipers can contribute to intelligence and reconnaissance activities (Konaev, 2019), providing relevant insights to improve the command and control of the operation (Hahn & Jezior, 1999).

2.2 Dual-use technologies in urban warfare

This section analyzes the main challenges with regard to unmanned vehicles and informational technologies. Both are identified as dual-use technologies available in civilian markets, and they can be used by both conventional and non-conventional actors. The main challenge is that when operating in cities, non-state adversaries will be able to use advanced capabilities such as artificial intelligence, UAVs, cyber capabilities and robotics (Khan & Romaniuk, 2023). These have constantly been used by ISIS combatants in Syria (Ball, 2017) and Iraq (South, 2018). In the case of information technologies, they have already been used for recruitment, propaganda and information exchange (Bin Inam & Rauf, 2024).

The use of technology is a relevant dimension in modern warfare, and its importance has led western societies towards a cult of technology that in some cases has voided the success of the operations (Van Creveld, 1991). The characteristics of urban terrain can limit the advantage of the attacker over the defenders, which could not only lead units to fragmentary operation, but also leave them without technological support. This limits the situational awareness of command structures in operations, as command and control require updated information about enemy positions and the movement of civilians on the ground (Hahn & Jezior, 1999).

2.2.1 The use of UAVs in surveillance and reconnaissance

Contemporary warfare has limited the aerial superiority of conventional armies, due to the availability of unmanned aerial vehicles to non-state armed groups (Konaev, 2019). This diffusion of technology has transformed the available resources, limiting the asymmetry between conventional military and other violent actors. UAVs have mainly been used for intelligence purposes and combat support, reducing the numbers of casualties in surveillance and reconnaissance actions (Bin Inam & Rauf, 2024).

As drones are usually equipped with cameras and high-definition sensors, they are used to improve combat support by obtaining intelligence from images, signals and signatures in urban areas (Chulilla-Cano, 2023; Morales-Morales, 2023). When deployed in densely populated cities, they are able to monitor physical areas and identify the selected targets. This aerial support can improve the deployment and performance of land forces. At the tactical level, the use of drones contributes to the flexibility of deployed troops, as drones can navigate between buildings, expanding the visual range of ground forces.

With regard to the future of urban operations, current drones pose some challenges that must be taken into account by military forces (Pérez-González et al., 2019). Armies will need to develop advanced data management systems to filter, analyze and diffuse real-time information. In this sense, the use of machine learning, cluster analysis and neural networks would offer significant advances towards improve decision-making processes at tactical levels.

In order to prevent non-authorized access to the information, UAVs would require strong encryption systems to build a multiple encryption layer between the drone and the operator. This defence would be complemented by proactive measures such as anti-malware software and intrusion detection systems. UAVs would also need anti-jamming technology to avoid provoked or accidental interferences. To this purpose, UAVs would require alternative frequencies to avoid interception and congestion, as well as advanced navigation systems not only dependent on GPS.

2.2.2 Communication and information technologies

The use of information technologies not only affects communications between deployed units, but also has a core influence over the cognitive domain. Dual-use technologies will keep transforming the dynamics of military operations, especially in urban warfare. If UAVs condition reconnaissance and targeting (Ball, 2017), information technologies would condition military performance and social support to deployments in urban areas.

Due to the density of the population and the infrastructure in urban areas, the damage derived from military operations is usually high (Khorram-Manesh & Brukle, 2022). In addition to its direct effects on military performance, the psychological and visual impact of the destruction can easily be instrumentalized on social media by non-state actors, to promote their narratives and gain support against the deployed forces (Bin Inam & Rauf, 2024). As objective facts are substituted by emotions and beliefs, information flows are even more relevant than in the past, as they define the levels of support to the conducted operations (Mölder & Sazonov, 2018). The impact of information can shape perceptions which can be turned into coordinated kinetic actions (Shallcross, 2017).

As global patterns of migration and connectivity have increased the diversity of cities across the globe (Elfvérsson et al., 2023), information flows not only impact the operational environment against the deployed forces, but also the homeland territory of the nation carrying out the operation or other nations supporting the military actions. Recent conflicts in Syria, Gaza, Nagorno-Karabakh or Ukraine have been characterized by the carrying out of several urban operations, involving a high number of civilian casualties, people displacement and infrastructure destruction. The availability of smartphones has allowed a constant exchange of information, and the organization of action networks in different locations has been a force multiplier in urban operations (Bin Inam & Rauf, 2024).

2.3 The role of local population

The density of urban environments is not only related to the physical infrastructure, but also to a greater presence of the civilian population than in rural areas. This is a key factor for military forces when deploying urban operations, as it constrains the available operational alternatives in order to avoid civilian casualties. Despite the fact that in some cases there has been a primacy of achieving military objectives, decision-makers must take into account the political outcomes of civilian casualties of urban warfare. The presence of civilians in urban operations poses challenges in blockade and siege operations, as well as in urban combat.

This dimension is critical, as in many urban operations there is a blurred difference between members or sympathizers of non-state violent groups and civilians (Sampaio, 2016). Even disregarding the ideological affiliation of civilians to the deployed conventional forces, it is clear that the presence of non-combatants affects the immediate operational phases and the further steps of the military campaign (Rosenau, 1997). In divided societies with previous experience of communal violence this factor is even more relevant (Elfvérsson et al., 2023b), as civilian groups must be considered as heterogeneous actors with different political agendas.

The presence of civilians in operating environments intensifies the need to correctly verify military targets (John-Hopkins, 2010), and means that the conventional rules of engagement impose restrictions on heavy artillery and air support (Konaev, 2019). Both capabilities are essential to the support of the deployed forces, so these restrictions, thanks to the need of international or local support, increase the chances of fighting in the streets. International humanitarian law demands that conventional forces apply precision fire to minimize civilian casualties and damage to infrastructure (Konaev, 2019). In addition to this, militaries are required to follow the principle of proportionality in the use of force, which also obliges modern armies to previously communicate attacks which will affect civilians (John-Hopkins, 2010). This last element not only reduces the initiative of the attacker, but also allows defenders to use civilians for combat purposes (Stone, 2009).

The civilian population can also be affected by several strategies of the deployed forces, especially in cases where humanitarian law is not respected. In some cases, attackers have blocked cities, cutting off supply chains to cause starvation in the civilian population, like in Syria, or shutting down water and electricity, like in Sarajevo (Hägerdal, 2020). These strategies have often been rejected not only due to their impact on the local population, but also due to the negative effects on public opinion. In addition to these specific actions, fighting in cities has led to other relevant problems related to infrastructure destruction (Bin Inam & Rauf, 2024); the destruction of essential infrastructure to provide water, sanitation, heat or electricity has usually led to later difficulties in terms of a refugee crisis or generalized health issues in the local population.

Access to social media and communications by civilians can also generate informal information networks by the use of instant message services as WhatsApp, Telegram or Snapchat (Konaev, 2019). This can provide real-time intelligence to defenders, increasing the vulnerability of the deployed troops. The presence of civilians in urban operations also has a clear impact on the cognitive domain of armed conflicts. As civilian casualties can be instrumentalized by media and social media campaigns, local and international public opinion can turn against the deployed actor (Bin Inam & Rauf, 2024). As pointed out earlier, confusion in clearly identifying the role of each group has several implications both for targeting and for recruitment by local non-state actors (Konaev, 2019; Bin Inam & Rauf, 2024). Particularly in those cases where conventional armies are fighting against non-state actors, the distinction between combatants, sympathizers, collaborators and non-combatants blurs, increasing the complexity of the military operations.

Conclusion The urbanization process is a key trend which will continue to condition future military operations. Cities present specific characteristics which differ from operations in rural areas, as not only physical structures but also the diversity of civilians living in urban areas must be taken into account. Deployment in urban environments also affects non-combatants, who can be both the victims and the supporters of the involved actors, especially when the deployed troops can be considered as an occupying force. Carrying out urban operations is also more complex when analyzing offensive actions, and fighting in the streets often implies a higher number of casualties. In this sense, urban warfare involves all the organizational, technological and humanitarian challenges which have been analyzed in this article.

Conventional forces must operate in small teams, combining capabilities from various branches. In urban scenarios, infantry has a core role, and combatants require great physical and psychological strength in order to carry out rapid tactical actions, with decentralized command and multilevel environments. The technological dimension identifies UAVs as a key advantage for both combat and surveillance. According to this analysis, armies should take into account data management, information encryption and anti-jamming systems to achieve operational success. The humanitarian dimension is also key in urban warfare, as it imposes restrictions concerning the use of force. This can be even more problematic where non-combatants could be instrumentalized by defenders, confusing their categorization as victims or collaborators. All this poses communication challenges in which public opinion and different media play a key role.

As per some policy recommendations, militaries need to update their tactics, techniques and procedures for urban warfare. In environments defined by large cities and dense metropolitan areas, conventional forces must adapt themselves to constrained spaces with fragmented combat lines. Training of combatants must be taken into account, focusing on physical and psychological performance. Western militaries require urban facilities to test urban warfare procedures. This is not a new proposal, as some NATO armies already have them, but it would be advisable to

design and build full-scale urban testing areas with multiple facilities to test specific procedures in, for example, train station, airport and underground operations.

Lessons learned in urban warfare require armies to have an appropriate level of technical instruction for the use of new weapons systems and other tools for surveillance and reconnaissance. In some cases, this can require abilities from the civilian arena, especially with regard to hardware and programming, which would allow the inclusion of reservists who could provide their civilian expertise in dual-use technologies. At the same time, the need to control communication flows is essential in the operational environment. In this sense, conventional armies, even more than before, require the presence of civil-military communication and public relation teams to improve narratives in media and social media. Solid communication strategies about operational activities would improve social and political support to guarantee the success of operations in urban environments.

This article provides a basis for the development of further research following the provided analytical framework. It would be relevant to apply this framework to the study of the characteristics of several urban operations as case studies, or even from a comparative perspective. The identification of relevant categories also allows a systematic literature review in these specific categories. Due to the consolidation of information technologies as tools for propaganda, recruitment and organization, it is important to study their effects on urban operations. Further research in the field of political communication would be advisable, by applying algorithm-based techniques. This would increase understanding of impacts from the cognitive domain on physical actions in operational environments.

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