

Logistics outsourcing for armed forces: The mobilisation of civilian transportation vehicles

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Abstract

One aspect of the total defence concept involves the temporary requisition of civilian transportation vehicles to meet the increased logistical demands of a wartime army. These vehicles are selected and managed in peacetime, mobilised at the onset of the war, used by military units throughout the war, and returned to their original owners afterwards. This paper presents a model for the reception process of such civilian vehicles during mobilisation. In practice, however, reception processes are not without challenges. Under the time constraints of mobilisation, issues may arise, including inappropriate reception, missed deadlines, and compromised operational readiness. To investigate these issues, the study employs conceptual modelling, supplemented by insights from professional experience. The main contributions of this paper include a conceptual model of the mobilisation process, a framework for maintaining records of mobilised assets, and a focus on previously underexplored mobilisation issues. Proper reception of mobilised vehicles significantly affects the transportation capability and operational readiness of military units as well as the accuracy of the post-conflict return process. Implementation of the proposed solutions requires careful consideration due to interdependencies with other aspects of the mobilisation process, such as doctrinal arrangements, administrative systems, mobilisation procedures as well as the quality and regularity of both professional and reservist military training.

Keywords:

mobilisation, outsourcing, military reserve, total defence, military logistics

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Introduction

The strategic environment for both national and international security has undergone significant transformations over the last decade, prompting many European nations to reassess their defence strategies to address emergent security challenges. This reassessment resulted in a general intention to bolster security capabilities and societal resilience through the adoption of a total defence concept. It became popular in several countries which found themselves potentially violated by much stronger feasible adversaries. Total defence concept entails the comprehensive mobilisation of societal resources (human, material, financial, political, and other) in order to respond to aggression and war situations. The importance of logistics in this framework is reaffirmed by the ongoing Russo-Ukrainian armed conflict (Ti and Kinsey, 2023, p. 381).

One aspect of the logistics of the total defence concept involves a temporary requisition of civilian transportation vehicles to augment military logistics during wartime. Essentially, this practice could be perceived as logistics outsourcing for armed forces. These vehicles are selected and managed in peacetime, mobilised at the onset of the war, deployed by military units throughout the war, and ultimately returned to their original owners after the war. To adhere to legal and ethical standards, vehicle owners are compensated for both renting of their assets and any damage to them. However, the operationalisation of these processes (selection, administration, mobilisation, reception, use, and return) in practice confronts a range of challenges. These include inappropriate selection of vehicles; outdated administration and wrong data; delay in mobilisation calls and arrivals; and technical shortcomings and vehicle malfunctions. All those factors contribute to the stochastic nature of the reception process, characterised by unpredictable arrivals and varying durations due to the uncertain technical state of the vehicles. Current protocols and regulations are insufficient for addressing these uncertainties. Mobilisation usually occurs in conditions associated with the onset of war, compounding great psychological pressures on the whole society, organisational turmoil, and confusion. These factors exacerbate the uncertainty and randomness in all activities, including the reception process for mobilised vehicles. Under such circumstances, the reception process may deteriorate and degrade, potentially leading to the acceptance of incomplete or malfunctioning vehicles. Furthermore, additional pitfalls may arise if the capacity of a reception point is overestimated, resulting in extended queues of vehicles waiting for reception and subsequent failure to meet mobilisation deadlines.

Given these complexities, this research aims to address the following question: How can the uncertainties related to the reception of mobilised civilian vehicles be effectively managed? I propose a conceptual model focused on the reception process for mobilised civilian vehicles. The methods employed in this research include a literature review, content analysis, analysis of lessons learned, comparative analysis, system analysis, and strategic management methods. This paper develops a model for the reception process of mobilised civilian vehicles, thereby facilitating resource planning and enhancing the effectiveness of military mobilisation. Mobilised civilian vehicles play a critical role in supporting transportation, one of the key functions of military logistics. Additionally, significant transportation capabilities are required for the relocation and dispersion of large quantities of materials from peacetime military warehouses to their wartime locations, especially to prevent the destruction of military supplies in the initial stages of war. Contemporary armed conflicts and other military engagements at crisis points underscore the importance of all aspects of military logistics (Pawelczyk, 2018, p. 88). The value and originality of this work lie in the fact that the logistics aspects of total defence “have not, until now, received much attention in the literature” (Antai and Hellberg, 2023, p. 1).

This scarcity of prior studies not only makes this work unique but also opens avenues for the future research.

In addition to its uniqueness and unfamiliarity to general readers, the mobilisation of civilian transportation resources for military purposes has historical precedents. To highlight the importance of this phenomenon, we initially highlight two significant historical events related to the wartime use of mobilised civilian transportation assets. This is followed by a section dedicated to the concept of total defence which has gained popularity in many European countries in recent years due to increased threats to national security. An integral part of this total defence strategy is the mechanism for mobilising the civilian assets needed to bolster the transportation capabilities of military units. To illustrate the widespread presence of this phenomenon, our discussion section offers a comparative review of approaches from several countries, chosen randomly based on data availability.

The main section of this paper provides both conceptual description and graphical representation of the mobilisation of a hypothetical wartime military unit at the brigade level, which primarily consists of reserve components for both manpower and material assets. In peacetime, such units contain only a small cadre of professional military staff responsible for administration, military equipment, and other materials for the entire unit. In the event of war, the unit undergoes mobilisation to reach its full strength, as specified by its wartime table of organisation and equipment. The terminology used for these units varies by country and current doctrinal practices; they may be referred to as territorial army units, reserve units, wartime units, and similar. However, units of this type may be treated as regular or professional military units and can be deployed far from their territorial base of mobilisation. A focal point of the conceptual model for mobilisation in this paper is the reception process for mobilised civilian vehicles. Along with a narrative description and graphical representation, the paper includes a list of reception records that must be verified during the vehicle reception process.

In the discussion section, the main characteristics of the mobilisation and reception process for civilian vehicles are highlighted. These characteristics are crucial for the further development of quantified models for simulation or for the application of other methods. Additionally, the section concludes with an overview of various national approaches to the mobilisation of civilian vehicles, selected from countries based on data availability. The purpose of this final part is to underscore the broader importance and relevance of the issues surrounding mobilisation.

Historical case studies

To illustrate the importance of mobilising civilian transportation assets, we can look to well-known historical examples from each of the world wars of the 20th century, involving two great powers of those times. The first example is the use of taxi cabs to urgently transport soldiers from Paris to the front lines near the French capital during World War I (WWI). The second example concerns the use of small civilian ships and boats for the emergency evacuation of British and Allied troops from Dunkirk on the French coast to the English coast during World War II (WWII).

The first example is a well-known story from the Great War about the taxis that saved Paris. At the outset of the war, in September 1914, German forces managed to approach the area near the French capital, Paris. There was an urgent need to transport troops to the front lines to defend the city. Although troops were available in rear areas, there was a shortage of transportation assets. National defence decision-makers found a solution by

mobilising taxi cabs from Paris to urgently transport several thousand troops to the front lines, thereby reinforcing the defensive positions around the French capital. According to the broader literature, approximately 3,000 taxi cabs transported nearly 5,000 soldiers. While this number of transported soldiers may seem small compared to the millions of soldiers engaged in that theatre of war or the high casualty rates, this event garnered significant respect among French citizens and boosted national morale.

The second example pertains to the Dunkirk evacuation, also known as Operation “Dynamo” in military planning. It was an evacuation of approximately 336,000 soldiers, primarily from the British Expeditionary Corps but also including some French and Belgian soldiers. The evacuation took place near Dunkirk, a location on the French coast along the English Channel, and lasted from 26 May 1940 to 4 June 1940. Prior to the event, military estimates had suggested that no more than 30,000 soldiers could be evacuated using available military resources. The idea then emerged to call upon all available civilian ships and boats in southern England for emergency assistance, and this call was acted upon. In summary, several hundred civilian ships and boats of various types responded to the call and participated in the maritime evacuation of 336,000 soldiers from Dunkirk to the English coast. In essence, this event was a classic example of the mobilisation of civilian assets for wartime purposes. Due to its importance and scale, it has become a heroic moment in national history ([Summerfield, 2010](#), p. 788).

Total defence concept—fundamental insights

The total defence concept is a term in the field of national security and defence that encompasses the use and mobilisation of all available societal resources to defend society and state during times of crisis and war ([Miklaucic, 2019](#), p. 148; [Veebel and Ploom, 2018](#), p. 7; [Wither, 2020](#), p. 62). The phrase “all available resources” undoubtedly includes various aspects of logistical outsourcing. One such aspect involves obtaining transportation capabilities for wartime military units by mobilising a variety of civilian transportation vehicles, which may be owned by different companies, organisations, or individual owners ([Brick, 2019](#), p. 11; [Da Costa, 2019](#), pp. 309, 317).

In recent years, the total defence concept has gained prominence, especially among smaller states, including those in the Nordic and Baltic regions ([Kepe and Osburg, 2017](#), p. 1; [Lunde *et al.*, 2020](#), p. 1). It has also seen renewed interest in Eastern and South-Eastern European states ([Berzina, 2020](#), p. 6; [Veebel and Ploom, 2018](#), p. 7). The concept is also popular globally, with Singapore being one of the best examples. Situated at a strategic maritime crossroads, Singapore has long been committed to the principle of total defence ([Matthews and Zhang Yan, 2007](#), p. 393).

While the concept of total defence is not new, it has historical roots in several countries. [Berzina \(2020, p. 2\)](#) offers an excellent comparative view, citing neutral countries like Finland, Sweden, Switzerland, Austria, and the former Yugoslavia. She connects the historical concept of total defence with the more modern term “comprehensive” national defence. Although there are other similar terms, such as territorial defence and comprehensive defence, this paper does not focus on terminological clarification; interested readers can consult [Veebel *et al.* \(2020, pp. 3–4\)](#) for further details. Notably, the concept of total defence is not restricted to neutral states; it is also relevant for countries involved in formal defence and security arrangements, such as members of the North Atlantic Treaty Organization (NATO). Several NATO countries promote the concept of total defence as an important, albeit not exclusive, factor in deterrence and national defence ([Norwegian Ministry of Defence and Norwegian Ministry of Justice and Public Security, 2018](#), p. 9).

Historical examples demonstrate that the total defence concept has been employed not only by small states but also by great powers engaged in decisive wars with their peer competitors.

The strategic perception of European and global security underwent a significant shift following the onset of the crisis in Ukraine in 2014. Prior to this, European countries had benefited from the end of the Cold War, and a sharp downsizing of armed forces seemed like a logical consequence for nearly all countries in Europe. However, the security situation has gradually deteriorated over the past decade, leading many countries to revise and upgrade their national defence concepts and capabilities. To avoid the re-emergence of large and expensive armies, small states have begun to develop total defence concepts tailored to their unique capabilities and policies.

The total defence concept encompasses issues related to the military reserve (reservists, citizen-soldiers), mobilised material assets, inter-ministerial coordination and cooperation, social mobilisation, and media support. While the concept sounds attractive and efficient in theory, various challenges can arise in practice. For instance, the mobilisation of a civilian entity—whether a reservist or material assets like vehicles—may not always be welcomed by the employing company or asset owner. Businesses have their own “battles” to fight on the market, and any depletion of their resources can be risky for their position on the market. A similar logic applies at the individual level for reservists (citizen-soldiers), posing a challenge not only for small states but also for other countries where reserve military components play a significant role (Coombs, 2019, p. 16).

Wartime armies emerge from peacetime armies through a process known as mobilisation. Compared to their peacetime counterparts, wartime armies are considerably larger, sometimes by multiples. This expansion is facilitated by activating military reserve forces, which empower both existing military units (already existing in peacetime) and reserve units (which do not exist in peacetime, except for a very small administrative team in command that takes care of administration and the storage of military material and equipment). The importance of mobilisation and the reserve component is well recognised in some countries (Horyn and Tomasik, 2022, p. 87; Ujhazy, 2018, p. 10), but room for improvement remains.

This paper is limited to exploring one specific component of the total defence concept: the procurement and sustainment of transportation capabilities for wartime military units. Specifically, it examines how vehicles can be temporarily requisitioned from non-military companies, organisations, and private owners. This temporary requisition is governed by appropriate laws that specify the conditions, obligations, and rights of all involved parties. In essence, the military is obliged to receive, properly use, and ultimately return these mobilised assets in the condition they were originally received, while the owners have the right to compensation for the duration of the requisition (similarly as with car rental).

Mobilisation itself is a broader and more complex process, encompassing numerous “measures in the political, economic, social, administrative, diplomatic, legal, and military fields, planned and prepared in peacetime, as well as the actions carried out to implement them” (Danila, 2021, p. 23). In this context, mobilisation can be considered one of the key components of the total defence concept. Mobilised civilian material assets may include, aside from transportation vehicles (lorries, trucks, vans, off-road vehicles, etc), other types of equipment and vehicles (various tractors, motorcycles, road-building machinery, cranes, etc.).

Outsourcing, in general, is a practice for procuring services or functions by contracting them out to external entities. The main reasons for outsourcing include achieving greater

efficiency and effectiveness. Organisations typically outsource non-core functions and tasks, as it is often not cost-effective to maintain these capabilities in-house. Logistics outsourcing can be defined as “a process that requires an external company to deliver the service within an agreed budget and time-frame” (Akbari, 2018, p. 1550). Military outsourcing shares similarities with this general practice. For example, Kinsey (2016, p. 21) identified three types of outsourcing for the UK military: outsourcing for troop support services (maintenance of non-combat assets, catering, and housing); outsourcing for weapon systems (tanks, helicopters, and military IT assets); and outsourcing for security protection services (contracted armed protection for convoys, facilities, and high-profile persons). Kinsey (2016, p. 28) emphasised that military logistics have become “a central aspect of British defence policy,” while the main reasons for military outsourcing include bridging the gap between strategic objectives and available resources (military resources); the impact of modern weapons technology (maintenance of advanced weapon systems is best performed by their contractors), and operational requirements (Kinsey, 2016, p. 28).

Methods

In order to adopt a comprehensive approach to the problem of mobilising civilian transportation vehicles, we employed various methods. The initial steps in any research study involve a search of the literature and selection, a challenge in this case due to the limited number of academic papers on the topic. The reasons for this scarcity are twofold: the traditional sensitivity associated with publishing military studies, particularly those concerning mobilisation; and the specific nature of mobilisation itself (the transition from peacetime inertia towards the fog of war; mobilisation is of short duration, almost neglected, compared to peace and war; it is in the shadow of a coming war; and a relatively small number of people deal with mobilisation issues). Lessons learned and exploitation of professional experience were invaluable, particularly in modelling the details of the vehicle reception process.

A comparative analysis of different national approaches confirmed the existence of the problem in multiple countries, which were selected randomly based solely on the availability of information. Strategic management methods have contributed to a greater understanding of the problem and its broader context.

System analysis proves to be useful when considering mobilisation in its entirety, given its multifaceted nature, which encompasses strategic, military, organisational, social, economic, legislative, political, administrative, and financial aspects. Cause-and-effect analysis is employed for identifying the main problems in mobilisation, which is the primary research question of this study. Inductive approach (Bryman, 2012, p. 12) serves as the principal tool in developing a conceptual model for the reception of mobilised civilian vehicles. A consistent graphical presentation of this model not only clarifies the problem but also provides a basis for potential quantitative analysis through simulation modelling or other operational research methods.

Conceptual model for the mobilisation of wartime military units

Mobilisation of a military unit is typically defined as the “transition to the wartime table of organisation and equipment” (Mozharovskyi and Hodz, 2021, p. 170). Nearly every military unit transitions from its peacetime structure to a wartime configuration. The differences between peacetime and wartime organisations can vary based on the unit’s

core mission. Mobilisation serves as the bridge between peace and war, and some authors clearly emphasise three distinct modes of military logistics operation: peace, mobilisation, and war (Ekstrom *et al.*, 2020, p. 185).

When a security crisis or war emerges, the highest national authorities (such as the government or president) declare a state of emergency and issue an order for mobilisation. This requires military units to transition into their wartime mode of organisation and operation. Figure 1 presents the main elements and subprocesses involved in the mobilisation of a reserve military unit within the total defence concept for a hypothetical country. Military unit commands issue mobilisation calls to reservists as well as requests for the mobilisation of civilian vehicles from their original owners (as shown in Figure 1).

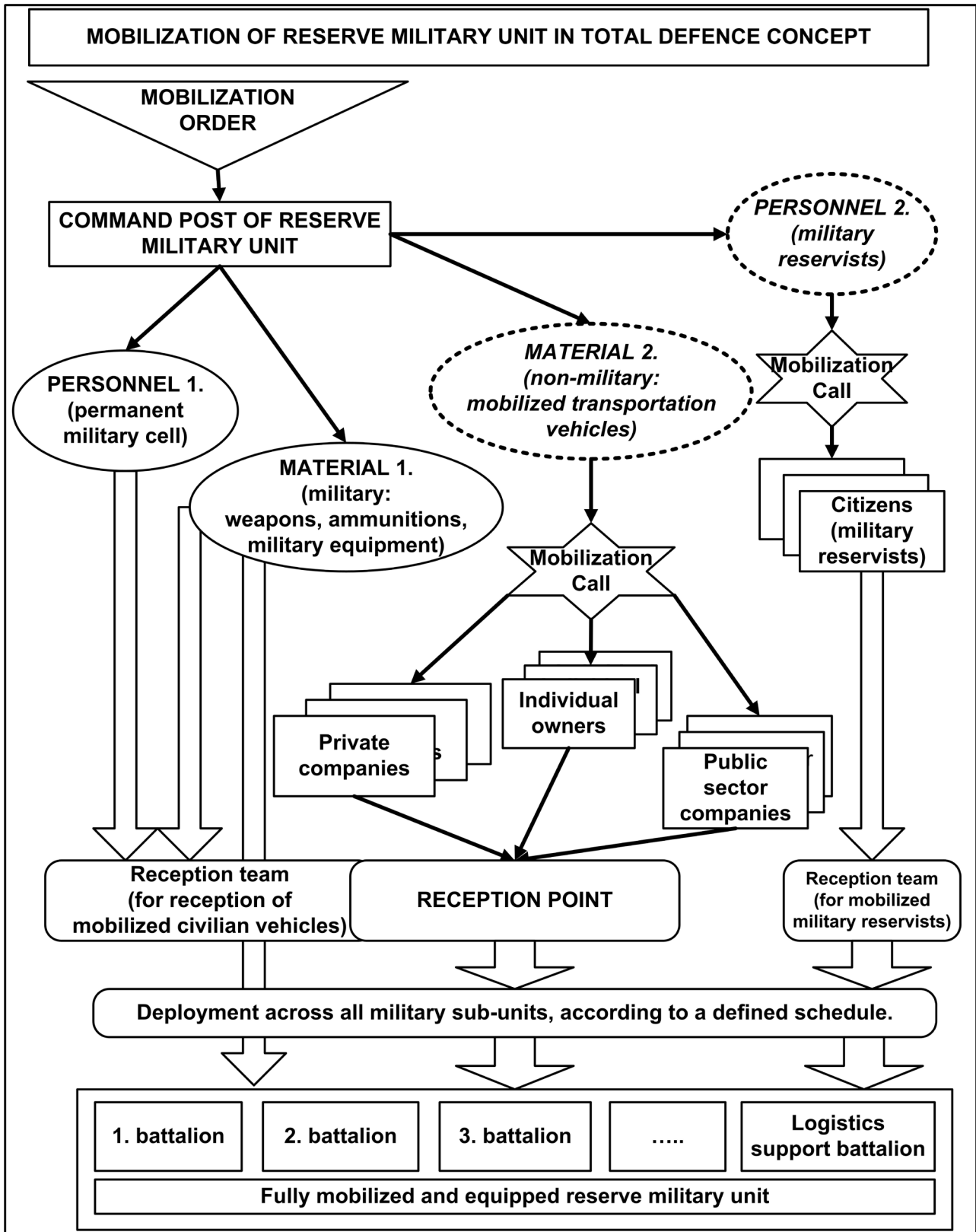
In parallel with other mobilisation activities, there is the process of receiving mobilised civilian vehicles, marked here as a reception point (Figure 1). The permanent staff of the military unit (constituting the core staff of the wartime unit and are present during peacetime) establish technical and administrative points for the reception of both mobilised civilian vehicles and military reservists (citizen-soldiers). The preliminary selection of vehicles to be mobilised should be conducted well before the onset of war and mobilisation. This planning should be systematic, properly executed, and regularly updated to account for changes in the ownership and technical status of civilian vehicles. Military commands have designated personnel (one or more military officers, and S1 [personnel] staff for reservists; S4 [logistics] staff for vehicles and other material) responsible for administrative and mobilisation issues. They liaise with territorial representatives from the Ministry of Defence (or specialised administrative bodies, agencies, etc.) across the country to maintain an updated understanding of the availability and status of transportation vehicles and their owners.

After receiving a mobilisation call, the owner of the civilian vehicle is required to promptly prepare and send the specified vehicle(s) to the military unit. Preparation entails ensuring that the vehicle is technically functional, equipped with the necessary tools, spare parts, and a full fuel tank. However, the commercial dynamics of the owner's business and daily use make it challenging to meet prescribed technical standards for mobilised vehicles; thus, it is unrealistic to expect them to be in ideal technical condition.

Upon arrival at the reception point, mobilised vehicles must be technically inspected by specialists, including technicians responsible for vehicle maintenance, drivers, and administrators, as part of a reception team (Figure 1). The processing capability of the reception point is constrained by several factors: a limited number of technical personnel, tight mobilisation deadlines, the randomness and variability of vehicle arrivals, and the potentially problematic technical status of the mobilised vehicles. These limitations and variabilities make it difficult to estimate the minimum level of resources needed at the reception point, highlighting the necessity for research and the application of various operational research methods. Institutions of higher military education—such as defence universities, war studies universities, public service universities, and military academies—which typically house specialised research centres and departments in addition to their educational components, serve as ideal venues for conducting in-depth research on various aspects of mobilisation (Nikolic, 2018, p. 67).

The reception of vehicles requires a thorough understanding of their technical status, including the recording of relevant information about the state, condition, features, and completeness of the mobilised vehicles. If a vehicle fails to meet the basic standards for functionality, it must be returned to the owner with a request for replacement. However, discrepancies may occur in practice, leading to the acceptance of vehicles that are not fully compliant. In any case, maintaining accurate reception records is crucial for both ongoing use of such vehicles and their eventual demobilisation and return to their civilian owners.

Figure 1. Mobilisation of reserve military units within the total defence concept.



Once the reception process is complete, the mobilised civilian vehicles are considered military assets and are deployed according to the plans and needs of the military unit. As depicted at the bottom of Figure 1, the result is a fully manned and equipped wartime military unit. For instance, a brigade-level unit with a corresponding number of battalions and other units (for combat, combat support, and combat service support) is shown. This can be viewed as a force-generation process, where a new military unit is formed through the appropriate integration of military and civilian resources.

The engagement of mobilised vehicles lasts as long as they are needed. Laws and regulations stipulate that the owners of the mobilised vehicles are entitled to financial compensation for this form of “leasing.” Demobilisation commences at the end of hostilities, at which point all mobilised vehicles must either be returned in the state in which they were received or compensated for if damaged.

Conceptual model for reception records of mobilised vehicles

Reception records detailing the technical status of vehicles, created at the onset of mobilisation, serve as reference points for comparing the condition of the mobilised vehicles at both beginning and end of their military deployment. The technical status includes details such as fuel tank levels, reserve wheels, car jack tool kits, tyre condition, battery condition, bumper condition, windshields, and side-view mirrors (see Tables 1 and 2).

If technical deficiencies, shortages, or imperfections in the mobilised vehicles were not noted at the beginning, then any wear and tear incurred during their use within the military unit should be attributed to the military organisation. This consideration (cost) further underscores the importance of a thorough reception process. Conversely, returning damaged or incomplete vehicles to their owners is also unacceptable. Such actions could have negative consequences for all parties involved and tarnish the reputation of both the military and the state.

During the brief period of mobilisation, numerous civilian vehicles must be properly inspected and received. Given the variety of owners and intended uses of these vehicles, they often vary in type, shape, age, and even their points of origin relative to the military reception site. To ensure accurate, comprehensive, and lawful procedures for the reception of mobilised civilian vehicles, their use in military units, and their eventual return to their original owners after a war or crisis, it is necessary to have appropriate documentation, detailing the exact technical condition and specifications of each vehicle.

A proposal for a form that includes all relevant technical and administrative data for mobilised vehicles can be seen in Table 1 (the front page of the reception form) and Table 2 (the back page of the reception form), under the title: “Reception records for mobilised vehicles.”

Academic, educational, and practical implications of mobilisation research

The results presented above could be utilised in three distinct directions: academic research, military and defence education, and practical defence and military preparation. In terms of research, the conceptual modelling presented could serve as a foundation

Table 1. Proposal form for reception records for mobilised vehicles (front page).

Reception Records For Mobilised Motor Vehicle—Front Page	
Military unit:	Date:
	Location:
VEHICLE IDENTIFICATION DATA	
Type:	Motor number:
Model:	Chassis body number:
Registration number:	Official traffic certificate number:
Year of production:	
VEHICLE OWNERSHIP DATA	
Owner name:	Phone:
Owner address:	Cell phone:
APR (Agency for Registering Business Companies) number:	E-mail:
Who brought vehicle [name, PINC (personal ID number of citizens, JMBG in Serbia)]:	
TECHNICAL DATA	
Fuel type:	Tractor: yes / no
Tank volume (fuel tank capacity):	Forklift: yes / no
Average consumption (l/km):	Towing hitch: yes / no
Truck payload (tones):	Tire type:
Dump truck: yes / no	Reserve tyre: yes / no
Box truck: yes / no	Number of wheels:
Tarpaulin-Box truck: yes / no	Batteries type:
Van: yes / no	Batteries number:
Refrigerator truck: yes / no	Cooling system type:
Fuel truck: yes / no	Cooling system volume (capacity):
OPERATIONAL EXPLOITATION DATA	
Vehicle life-span in mileages (km):	Motor starting process:
Fuel level in gas tank:	Motor starting system state:
Coolant (cooling liquid, antifreeze) level:	Motor general state and operation:
Brake fluid level:	Brake system state:
Motor oil level:	Vehicle control system state:
Batteries serial numbers:	Bumpers conditions:
Batteries production year:	Headlights function:
Batteries producer/manufacturer:	Brake lights function:
Batteries general state:	Turn signal/Blinkers function:
Tyre production date (week/year):	Windshield wipers function:
Tyre producer/manufacturer:	General state of cabin and body:

for further development of simulation models of military unit mobilisation and/or models for the reception of mobilised civilian vehicles as well as for the application of other quantitative methods of operational research. Why the focus on research and simulation? Many activities in the mobilisation process exhibit stochastic, rather than deterministic behaviour. One of the rare deterministic factors is mobilisation time, which is usually

Table 2. Proposal form for reception records for mobilised vehicles (back page).

Reception Records For Mobilised Motor Vehicle—Back Page	
COMPLETENESS DATA	
Warning Triangle:	Snow chains:
High Visibility Vest:	Basic maintenance tool kit (screwdrivers, pliers, adjustable wrench, tyre pressure gauge):
Emergency first aid kit:	Car Emergency Light Bulb Spare kit
Car Fire Extinguisher:	Side-view mirrors:
Reserve wheel (spare tire):	Rear-view mirror:
Car jack tool kit:	Windshield wipers:
Towing cord/bar:	Truck tarpaulin:
PERSON WHO GIVES VEHICLE:	PERSON WHO RECEIVES VEHICLE:
Name:	Name:
Surname:	Surname:
Personnel sign:	Personnel sign:
CONFIRMED BY MILITARY UNIT TECHNICAL OFFICER (J-4 representative)	Rank:
	Name:
	Surname:
	Personnel sign:
	Date:
NOTE: produced in copies	

predetermined by higher command. However, many other activities are stochastic in nature, justifying the involvement of simulation modelling.

In the educational context, the results could assist defence and military personnel by clarifying the intricacies and complexities of mobilisation preparations. Mobilisation, in general, is a unique and specific activity of short duration. The impression of this author is that mobilisation issues are under-researched and typically occupy a minor role in defence preparation. The third direction involves the practical application of the conceptual model of mobilisation as a starting point for further development and planning for specific units, including the incorporation of more detailed considerations.

To corroborate the broader importance and relevance of the mobilisation issue under consideration, the next section provides several national approaches for the mobilisation of civilian vehicles in countries selected randomly based on data availability.

Some national approaches for mobilising civilian transportation vehicles

In some countries, the transportation capability of military wartime units is largely supplemented by mobilised vehicles (temporarily requisitioned, expropriated, or taken into

possession by the state) that belong to various civilian owners. For example, in Estonia, an established database exists for approximately 2,700 civilian vehicles of various types that could be mobilised if needed ([Kund, 2019](#), p. 1; [Szymanski, 2020](#), pp. 13 and 17). A rough estimate for other small countries, in the absence of specific data, could be made by comparing population size, the country's territory, the size of the wartime army, and other factors. Following this logic, the number of civilian vehicles suitable for mobilisation could easily reach 10,000 or even more.

Similar concepts of mobilising civilian assets for military purposes or for national security needs in times of crisis exist in several other countries. Examples are presented here based on the availability of information as well as to illustrate similarities in main concepts despite geographical distances, differences in strategic environments, national perceptions of security threats, country sizes, populations, and international affiliations.

[Manunza et al. \(2020, pp. 6, 52\)](#) explore in detail a set of problems related to the mobilisation of civilian assets in the case of the Netherlands, within the legislative framework of the European Union (EU). Their comprehensive approach could be highly useful for other EU member countries. They point out that for member countries of the EU, which implies a common market and market regulations across the EU, the situation is more complicated than for other countries. This complexity arises because national defence issues of the EU member states are still largely "national" in scope, while market players and actors (companies and workforce) operate on a more "European-wide" basis. A hypothetical scenario illustrates this complexity: How would it be possible to engage or mobilise logistic assets for the defence needs of an EU country XX from a company BB, which originates from an EU country YY but conducts its business operations and maintains infrastructure in the EU country XX, which faces a security threat? The situation becomes even more complex if, besides material assets, personnel (such as asset operators or drivers) from the company BB, bearing in mind that nationality of the BB company's employees could be nationals of country XX, YY, or even a third country. This is a challenging issue because, in many countries, if not all, the fundamental precondition for military service is citizenship of that country ([Manunza et al., 2020, p. 54](#)).

A comprehensive description of how non-military sectors in Polish society are prepared to support the Polish Armed Forces is provided by [Lewandowski \(2019, p. 78\)](#), who predominantly focuses on administrative and legal regulations. [Konarski \(2020, p. 59\)](#), on the other hand, concentrates on discussing the obligations of non-military entities to secure transportation assets for various purposes, specifically for use by security and defence agencies in the event of mobilisation. According to the Defence Concept of the Republic of Poland ([Ministry of Defence, Republic of Poland, 2017, p. 63](#)), "The Council of Ministers, other central bodies, local authorities, and business enterprises critical to the country's security should also be prepared for mobilisation." Furthermore, appropriate legal regulations are codified by the parliament in a manner that is simplified, comprehensive, mutually beneficial, and, above all, practical.

In Sweden, the Minister of Defence has offered a clear explanation of the Swedish concept of "total defence" ([Miklaucic, 2019, p. 148](#)): "Total defence is the total mobilisation of society in a war situation—what you can mobilise on the civilian side and on the military side together, and what you can do on the civilian side to support the military effort. It includes what you can do in private companies, as well as in the public sector and authorities." It is evident that the mobilisation of civilian vehicles is a constitutional part of the total defence concept, as practiced in Sweden ([Ministry of Defence, Ministry of Justice, Government of Sweden, 2018, p. 1](#)). A similar approach to the total defence concept exists in nearby Norway ([Wither, 2020, p. 67](#)).

In Serbia, legislation (“Law on Military, Working, and Material Obligation”) details the obligations and rights concerning the engagement of non-military transportation items, other material resources, human workforce, and military obligations for reservists ([Ministry of Defence, Republic of Serbia, 2009](#), p. 671). The Serbian case is particularly interesting due to its unique global experience in the practical application of its concept of total defence. Specifically, Serbia was the largest republic in the former Socialist Federal Republic of Yugoslavia, a leading non-aligned state that developed and practiced its own version of total defence (the Concept of National Defence and Social Self-Protection). Former Yugoslavia was geographically located in the Balkans, South-East Europe, and strategically was between two military-political blocks (NATO and Warsaw Pact) in the Cold War period. However, in 1991, Yugoslavia degraded from six to only two republics (Serbia and Montenegro, which adopted a new name for the state as the Federal Republic of Yugoslavia) by dissolution of its constitutional republics into several small states, while its concept of total defence failed (for more details, see an excellent study by [Berzina, 2020](#), p. 2). In 1999, the Federal Republic of Yugoslavia faced an armed attack by NATO, putting the concept of Serbian variant of total defence to a practical test. Research on the performance of Serbian total defence in action in 1999 is scarce, if available at all, but would be particularly interesting because of the uniqueness of that experience. That experience could be very interesting and useful, particularly for smaller countries facing threats from larger, asymmetric adversaries. This is currently the case in Eastern and Northern Europe as well as other parts of the world.

In Brazil, an example of a large country outside Europe, the mobilisation of civilian assets is a regular part of defence logistics ([Da Costa, 2019](#), p. 311): “in situations of armed conflict, several transport resources may be mobilised, including vehicles, personnel and physical infrastructure.” The author also added that the mobilisation of civilian assets, whether contracted or hired, must be rational and economically efficient—not exceeding what is genuinely needed. Public and private companies, as well as local and federal entities, are obligated to provide goods and services to military units in case of armed conflict ([Brick, 2019](#), p. 11).

Interestingly, similar approaches concerning the mobilisation of civilian transportation resources can be found in the case of some great powers like China ([Ministry of National Defence, People’s Republic of China, 2004](#), p. 1), Russia ([Pogorelov and Kolyaskin, 2001](#), p. 1), and Turkey ([Ministry of Defence, Republic of Turkey, 2017](#), p. 1).

Contemporary armed conflicts, characterised by large military engagements, high attrition rates, and the employment of new military technologies, would bring new experiences and insights into various aspects of total defence. These include issues related to mobilisation, logistics outsourcing, sustaining logistics, supply chain dynamics, multi-level inventorying, maintenance (recovery, repair, field maintenance, depot maintenance, and spare part policies), evacuation (of damaged material assets and casualties), interoperability with partner countries, training, and education.

Conclusions

This paper focused on the consideration and modelling of the reception process of mobilised vehicles for reserve military units within the context of the total defence concept. The main aim of this work was to bridge the gap between formal mobilisation procedures and the perceived conditions of a real environment fraught with inherent uncertainties and randomness. The conceptual model presented, which emphasises the reception process of mobilised vehicles, aimed to clarify the entire

process, identify weak points and potential challenges, and provide a basis for the development of simulation models. The relevance of this topic is twofold. First, the appropriate reception of mobilised vehicles directly influences the transportation capability and operational readiness of military units. Second, the precise identification of the technical state, condition, and completeness of mobilised vehicles enables the correct execution of the return process to their owners during demobilisation after a war or crisis.

Having presented historical examples of the mobilisation of civilian transportation resources to support military efforts, we discussed various aspects of the total defence concept. The main body of the work was dedicated to describing the process of mobilising wartime military units, with a particular focus on the reception of mobilised civilian transportation resources and their importance. Given the scarcity of academic literature on this subject, examples from several countries were provided to underline the broader relevance of this topic.

When looking at potential practical implementation of the suggested solutions, careful consideration is needed due to their dependencies on other aspects of the mobilisation process, such as doctrinal and normative arrangements, the system for administering mobilisation, the system for calling up reservists and vehicles, the quality of the professional nucleus of military units, and the quality and regularity of military training for both reservists and professionals.

The future research could be oriented towards the further development of the conceptual model into a simulation model, with the aim of providing quantifiable insights into the process under study for various experimental conditions. Additionally, a detailed consideration of mobilisation issues could contribute to the education and training of defence and security professionals.

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