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PRINCIPLE OF MILITARY INNOVATION AS AN UPGRADE TO THE ARMY CONCEPT: DIFFERENCES, SIMILARITIES AND LESSONS. A CASE STUDY OF ISRAEL AND ESTONIA.

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I hereby declare that I have compiled the paper independently and all works, important standpoints and data by other authors has been properly referenced and the same paper has not been previously presented for grading.

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ABSTRACT

The current thesis provides a distinct outlook and overview on the concept of military innovation by analysing how and to what extent the military doctrines can have an impact on it. The main point of this research paper relies on the fact that the innovation in the military sphere is defined differently than in any other sector. Coming from that, the author uses the four theoretical models developed by Barry Posen. These models provide framework and prediction towards the initiation of innovation within a country's defence forces. Based on this, the armed forces of Estonia and Israel are taken as case studies to analyse the innovation within the doctrines and see how the innovation principle is seen by these two armies.

The main hypothesis states that Estonian Defence Forces can be improved and become more effective by studying the doctrines of Israel's military and by looking for ways to adapt some of its elements.

KEY WORDS: defence forces, Israel, Estonia, military doctrines, military innovation models.

ABBREVIATIONS

AAR - After Action Review

CALL - Centre of Army Lessons Learned

CCDCOE - Cooperative Cyber Defence Centre of Excellence

CV90 - Combat Vehicle 90

DIA - Defence Investments Agency

EDF – Estonian Defence Forces

EDIA - The Estonian Defence Industry Association

EDSIC - The Estonian Defence and Security Industry Cluster

GDP - Gross Domestic Product

IDF – Israel Defense Forces

ISAF - International Security Assistance Force

KM - Knowledge Management

KO - Knowledge Officer

MAMRAM - Merkaz Mahshevim VeRishum Memukhan (Israeli acronym)

NATO – (The) North Atlantic Treaty Organization

MDS - Missile Defence Systems

NCO - Non-Commissioned Officer

NDDP - National Defence Development Plan

STANAG - Standardization Agreement

WMD - Weapon of Mass Destruction

INTRODUCTION

One of the biggest and historically most important fields of attention has been the military maintenance via modernization. Throughout centuries, different states have had their own unique ways of improving their armies to be ahead of the rest of the world and, especially, their neighbours (Roxborough 2000). Nowadays, the biggest change is the implementation of ICT, to properly synchronize the military with fitting mechanics of modern control and to learn how to better apply all the innovations in the classical field of research. However much more relevant are the matters of the innovative though behind more general approaches to the army concept. These approaches, which are defined by the culture of the state and further specified within the formal military doctrines set the platform for every new adaptation and innovation inside the military industry. Military thus is one of the oldest fields of study which, in order to keep up with the times, needs to be adjusted to the modern innovative comprehension and functionality (Goldman & Andres 2007).

Military innovation has been a massively discussed concept in the last decades, as specialists analyse and see it from many different perspectives. They have tried to agree with an exact definition of the concept so that the further studies will have a similar starting point. However, as the field comes with so much history and cultural variations, many definitions have started to appear and opinions got divided. For instance, some experts view military innovation as a total reorientation of military force, with a huge impact on the organizations and different strategic visions. On the other hand, the opposing thoughts put the focus on knowledge, intellectual abilities, growth and results (Grissom 2006). The clash of ideas is therefore between the technological and doctrinal points of view.

Nonetheless, even with the variety of opinions, there are also many theories which have common points and conclusions and this current thesis mostly relies on them. Among all, the ideas and analyses of Barry Posen and Stephen Peter Rosen stand out the most. S. P. Rosen sees the military innovation as something major and in defining the concept, he spreads the term "major innovation" (Weatherington 2009). According to him, it is all about a new concept of war, especially at the organizational and operational level. Rosen views the innovation in the military sphere as a total operational change and it comes as a forced and revolutionary process for the current fighting arms to alter their vision, strategies and relationships, and give up on traditional ways of planning, fighting and thinking. Barry Posen, on the other hand, perfectly sums up the arguments of many military analysts, experts and

authors and makes a model of four schools of thought (Posen 1984), which aims to predict if one state's military will be innovative or not. The four designed models all analyse the roots of military innovation climate within one nation. Two of them (civil-military and cultural models) study how nation's activity and support towards its military go hand in hand with how innovative and effective its army will be, while the other two (intraservice and interservice models) purely look into in-military developments. In his theoretical design, B. Posen studies the roles of military doctrines from the lens of nation's cultural specifics (in society and in military). This is important, because in order to find context and ways of applying each model individually, both civil and military realities need to be understood.

The author of this thesis analyses the aspects of innovation principle within the doctrines of Israeli and Estonian Defence Forces as case studies. The main reasons for choosing these specific countries are the following: 1. Both are small states according to all the criteria of the "small states theory" (Raadschelders 1992); 2. At the international level, both countries occupy important spots on the Global Innovation Index's ranking of 2018: Israel ranks number 11 and Estonia number 24. These places represent an increase compared with the previous rankings from 2017, for both Estonia, which ranked number 25, but mostly for Israel, which ranked number 17 (Global Innovation Index 2017 & 2018); 3. Uncharacteristically for small states, both Estonia and Israel value military development and its presence very highly. As it is known, Israel has one of the most innovative, independent and technologically advanced military forces and doctrines in the world, with a 4.73% of its GDP invested in the military expenditure (The World Bank 2017). On the other hand, Estonia proved itself to be a serious military planner, as it is in the top three NATO states to reach the necessary 2% GDP threshold (NATO 2018); 4. The two countries have compulsory military service for its citizens (in case of Israel for both males and females) and have threatening neighbours who have showed signs of aggression. Even so, Estonia, a country which is frequently named the 'Silicon Valley of Europe' due to its innovative mindset, is lagging behind Israel at the innovation within the sphere of military, although by looking into all the above points, the country should have the capabilities to be ranked higher than it currently is.

The aim of the thesis is thus to find the connections between innovative military paradigm in analysing Estonia and Israel. Despite all the mentioned similarities, these two countries have many differences, which can be analysed and compared via the four models of military innovation and doctrines. This leads the author into finding the answers to the following research questions:

1. How military doctrines shape the success of the modern armed forces? What is the role of doctrines in triggering innovative models presence in the military?

2. Considering the role of military doctrines in general, can Estonian Defence Forces apply Israeli Defence Forces' experience and specifically carry over some elements? If yes, which elements are those and how can they impact innovation within the military?

Methodologically, in order to properly understand the background of both Estonian and Israeli military specifics, the author uses multiple qualitative research methods. Also, to draw a proper comparison and answer to the research questions, under the qualitative method, as data collection, the author conducted three interviews with Estonian military experts. This helped the author to find out very specific details about the current situation of Estonian military doctrines and see, from the experts' point of view, how comparable the two military forces are. For the interviews, there were prepared semi-structured questions. The research strategy stays under the exploratory research method, considering that such comparison has not been explored before. Also, the case study design is applied.

In the case of Estonia, to remove certain ambiguities found in various primary and secondary sources, the main chosen method of analysis is represented by the interviews. Additionally, the methodology of data collection from various primary sources on doctrines in both Estonia and NATO is used to further comprehend the full picture.

For Israel, the methodology is mainly centred on the case studies of its various combat strategies, which all stem from one big and many smaller doctrines. The narrative research, as well as data collection of highly militarized Israeli society is conducted to further illustrate and summarize the innovation principle inside the IDF.

Barry Posen's theory is applied and used as a lens to see if the militaries of Estonia and Israel have any of the characteristics of the four models present in their doctrines. After that, the author compares the similarities and points out the differences within the two countries and ultimately proposes some lessons that could be of benefit.

Thus, the main hypothesis asserts that Estonian military effectiveness can be further improved by studying the doctrinal characteristics of Israeli army.

The first chapter of this thesis outlines the theoretical background which is used in defining and explaining the nuanced definitions of what constitutes the innovation within the military

sphere. Additionally, the concepts of doctrines, military culture and the four models of military innovation are developed to be applied in the later chapters. Chapter two provides a narrowed and detailed overview of the Israeli doctrines, and proves the point mentioned above, that indeed the Israel's armed forces are one of the most effective and innovative in the world. Chapter three describes the Estonian military experience and ends with a main subchapter of findings where the author presents, in comparison with the Israeli case, the differences, similarities and lessons drawn from the research, having as main source the interviews conducted with the Estonian military experts. The conclusion sums up the current situation of IDF and EDF and adds up proposed ideas and angles for further research. Also, in the conclusion, the readers can find the clear answers to the research questions of the paper.

1. THEORETICAL FRAMEWORK

Studying the principles of what constitutes an innovation can be challenging, since most of the scientific articles do not uniformly agree on one definition. In classical sense, innovation is both the invention of something brand new and an improvement of something which already exists. The main goal is put on solving a certain problem by restructuring how it is being comprehended. The military innovation, on the other hand, is only outlined as such when the three criteria are being met: 1) The military functioning as a whole must be dramatically impacted (improved); 2) Innovation must drive big changes (Posen 1984, 47). Characteristic and often cycled minor reforms within military are not classified as innovations; 3) The consequence of the innovation must carry the guarantees of greater military effectiveness in combat (Grissom 2007, 906-907). The significance of such distinctness makes it clear that very rarely a single person, despite having vast knowledge in technology, can propose ideas for the military without educating oneself in military science.

Additionally, the common element of implementing the innovation within the military revolves around two principles. The first principle is the more common 'Top-down process' under which the information flows from the highest echelons of social and military ranks to the lowest levels of authority (Posen 1984, 226). This way the shift will start from the plans, decisions and orders of politicians and high ranked generals towards their subordinates who will follow along as they are being told. Since military is the most authoritarian institution in history, the 'Top-down process' has been the most used way of processing data and generating its implementation.

The second principle is more distinct, 'Bottom-up process', where the information is expected, and often required to come from infield experimentation (Grissom 2007, 923). In such cases, the policy will often be on halt until the confirmation of its effectiveness flows upward from the soldiers who are impacted the most. In this case, the generals are expected to listen to soldier's feedback before passing any kind of impactful directives. The modes of bottom-up implementation fuse together both social and technological component of each state's military. Technologically, the example is when a new invention (or strategy), before being massively implemented, is first passed into the testing to gain feedback by the soldiers who are going to end up using it in combat. If the invention is justified, which is done by the confirmation of lower level personnel, the high ranked policy makers pass it into mass-production. If the invention will not prove itself useful, then the soldier, instead of discarding

it, can either rethink its design or propose its usage in another military branch, therefore saving the valuable time and resources (Ibid, 921).

1.1 THE 4 MODELS OF MILITARY INNOVATION AND MILITARY CULTURE

The factors which determine whether a state will have the bottom up or top down process of military policy implementation depends on a few factors. One of them is a systematic model, proposed by the military scientist Barry Posen, which seeks to explain the components which determine if one specific military organization will innovate or not.

Barry Posen has pieced together the four primary schools of thought within the military science. Each school has constructed its own explanatory model of sources and determinants for the innovation within military organization. The four schools focus on civil-military relations, interservice and intraservice politics and organizational culture.

1.1.1 The Civil-Military Model of military innovation

The Civil-Military Model of military innovation directly stems from country's civil-military dynamics. From the cultural perspective, it analyses the support, co-existence and co-acceptance of one nation's civilian population towards their military organization and its effects on the nation's culture (Avant 1993, 413). In a well harmonized and balanced state, the military will adjust itself based on country's civil needs and demands. The main innovation principle here is based on the top down chain of actions. This is because, under this model, the elected civil statesmen will equally impact the civilian and military developments via various directives.

According to Barry Posen, this model projects itself more often among states that are either preparing for, or are in a state of war. Prior to the Second World War, the civil demand for quick conquest among German population resulted in military developing the previously unseen and very innovative mechanized blitzkrieg tactics (Posen 1984, 190). As a countermeasure, as soon as the war broke off, the British public demanded to its military to better guarantee the homeland security, which pushed towards the invention of such vital military tools as the system of radars, command centres and unified fighter squadrons (Ibid, 171-172).

Thus, it can be argued that the civil-military model of military innovation is only relevant when the society feels threatened by external forces. In many cultural societies the real threat is what causes political leaders to push for innovation (Ibid 232-235).

1.1.2 The Interservice Model of military innovation

The core argument of the interservice model is that resource scarcity is a key catalyst for innovation. This model analyses the inter-military competitiveness among the nation's various military units. Since each government distributes limited resources to its military, the inter-military model argues that each unit competes for getting a bigger cut from the governmental purse. The decision on which military organization deserves bigger budget comes usually from the technological development within each unit. Having bigger impact on developing new systems will allow the military unit to get a bigger share of finance from its state. Additionally, military organizations seek to maintain their stable budget inflow by having an authority and expertise within their own field. This requires them to maintain the relevance and high standards within their traditional missions. On occasion, a new mission area may emerge in which none of the services has a dominant advantage, or an old mission may be reopened for competition between the services. Developing new capabilities to be able to manage the new missions opens the door to innovation (Grissom 2007, 910-911).

1.1.3 The Intraservice Model of military innovation

The third model describes the competitiveness and relationships within the same military branch (air force, army and navy). The intraservice model does not consider each military branch as a unified entity. Instead it focuses on analyzing the most micro aspects of one unit to extract the sources of innovation within it.

Stephen Peter Rosen, from whose ideas the model was made, writes that successful innovation needs a unified approach from various high-rank generals, mid-level officers, regular soldiers, as well as holistic institutional support to protect the longevity of the innovation (Rosen 1991, 165-168). By this principle, the innovation process starts when high rank leaders begin a new strategy of military victory (or a theory for more efficient warfare). As a result, a competition of ideas and personalities emerges within the service and various

advocates of the new theory will look to find allies and resources for their cause (Ibid, 20). It is often being done by seeking exceptional low rank soldiers or mid-level officers, providing them with professional career opportunities and allowing them to carry through the new idea. Typically, this involves the establishment of a new branch within the unit by recruiting more talent from that same unit. Once all of these elements are in place: the new theory, the new branch, and promotion pathways, the service has accomplished innovation (Grissom 2007, 914).

The uniqueness of the intraservice model can be seen in its theoretical core, under which the line of competition and cooperation becomes blurred. Because of this, the intraservice model can be more effective among highly bureaucratic states. If money is being given for one thing, the generals can refocus and spend them on something more useful, thus innovate.

In addition, the intraservice model is the one which combines the top down and bottom up principles into something unitary.

1.1.4 The Cultural Model of military innovation

The fourth model argues that the innovation quality, as well as quantity within military, largely depends on the country's culture as a whole. In short, a culture is defined as "intersubjective beliefs about the social and natural world that define actors, their situations and the possibilities of action" (Grissom 2007, 916). Primarily, the culture impacts the military by fundamentally shifting institutional reactions to various technological and strategic opportunities.

According to Farrell and Terriff, culture can shape military innovation in three ways. First, the high rank generals, who emerge from the single cultural space, can actively push for organization to move toward innovation (planned change). Second, the external factors can impact the culture so much that innovation will become a matter of survival (forced change). Third, the strong military culture of another state can be used as a model to push for innovation within one's own armed forces (Farrell, Terriff 2002, 69-80; 130).

Some experts support the views of Farrell and Terriff by giving examples of how during the 1930s, the French society changed their approach towards military conscripts to serve shorter terms. This impacted the mindset of high rank generals to adopt more primitive military

strategies because of their disbelief that short term conscripts would be unable to carry out more complex missions and warfare tactics (Grissom 2007, 918). This supports the view that in order for military not become stagnant, the state's society must support it in different ways. Thus, the cultural model of military innovation describes a non-rational and instinctive drive toward innovation, based on social beliefs and norms.

Lastly, the model argues that high rank generals are the agents of innovation by using the top down principle to push for change in culturally influenced military institutions. Senior generals can manipulate the culture to ensure that the bulk of the service aligns with the needed innovation. They recognize the need for change, formulate a new way of warfare, position their organization to properly support new ideas, use political leverage if needed and change the curriculum of military education to force the change towards innovative mindset (Ibid, 920).

It should be noted that the impact of culture on the military (the fourth model) is not the same as 'military culture'. Despite being closely related and mutually co-dependent on one another, the military culture is a certain intra military cultural phenomenon, which is not present in every military institution as well as in every country.

1.1.5 Military culture

Military culture represents the ethos and professional attributes, both in terms of experience and intellectual study that contribute to a common core understanding of the nature of war within military organizations. In the latter case, this is particularly true because military institutions must spend long periods of time not being engaged in their fundamental purpose, which is war itself (Murray 1999, 27). Instead, they analyse the development of technology, strategy, tactics and changes within society to understand their impact in war, without directly testing those frameworks until war occurs. Thus, military culture represents the intellectual and spiritual capacity of the armies, naval forces, and air forces to come to grips with the business of preparing for and executing war (Ibid, 28).

1.2 THE VITAL COMPONENT OF MILITARY DOCTRINE

Military doctrine (from Latin: doctrina, meaning 'teaching' or 'instruction') is a nation's belief system which takes a middle ground between country's military tactics and political grand strategy which sets the stage towards the direction where the country is heading. It outlines the broader set of issues on how state's military is to wage wars, in what way to fight each potential enemy, as well as ranking the enemies by importance (Avant 1993, 410-411). In most cases, a country's (or organization's such as NATO) doctrine fits well with the general perception of how it generates security, how general public perceives its nation's defence, as well as how its policy makers operate. Thus, the states that are usually more aggressive in war tend also to have more offence-oriented doctrines (Posen 1984).

For more general case studies, the military doctrines are vital component. Since they emerge from nation's historical experiences, theoretical understanding of military dynamics, modern geopolitical realities, geographic specifics, cross-continent partnerships and alliances, it is almost always the case that every country has its own doctrine.

Closely connected to the cultural model of military innovation, the doctrines emerge from the cultural realities of each state. According to some experts, the doctrines are rarely developed via the top-down principle, because they mostly originate from the in-field military dynamics. The key figures are usually lower level officers who look at the general strategy of war and create the most relevant hands-on tactics, sometimes despite the reluctance of their senior-most leadership (Grissom 922).

The role of doctrine in military innovation often comes from whether the nation views itself as offensive or defensive in the war scenarios. It all depends on nation's security goals, since technological innovation in areas that are unimportant for state's security could drain important resources that may, in long run, undermine security (Knox, Williamson, 11-14).

Barry Posen, who analyses how uneasy it is to forcibly change the doctrine, explains that most military organizations prefer to have the offense oriented doctrine, because it allows for better control-overview of the conflict, thus there is less uncertainty and higher chances of winning the war. Once, throughout time, the military has developed the general normative for all the strategies and tactics, so with that the resistance to change will rise significantly. The reason for that is the belief that any change will increase the factor of uncertainty, which every organization looks to avoid at all costs. It is often difficult to implement the new and fresh

technology together with new tactics of warfare if the previous effective concepts were part of 'standard operating procedures'. From the military culture point of view, the organizations looking to protect themselves from, often misinformed, political involvement create strong autonomy within their doctrines as to not allow for any change coming from the top. In order to apply big changes, the high command must change the majority of its staff to implement new ideas, often risking to lose the set-in-stone principles, which can majorly weaken the nation's military capabilities (Posen 1984, 47-50).

Since military organizations frequently push for autonomy from various external actors, it can be difficult to place doctrine as fifth model that encourages the military innovation. Yet, it could be done because the doctrine is part of every military action and reaction. Barry Posen argues that the doctrine's impact on military innovation is significant as it encompasses the norm of military values and prestige (both in war and during the peacetime). Posen brings forward the two reasons of how military innovation can emerge from doctrinal concepts: 1) As a result of continuous and major failures during the military operations. This is doctrinally important, because major failures challenge the very existence of military, not just the temporary prestige. The military must thus find new ways to fulfil its essential role. 2) As a result of external pressures. These can come as a result of various forms of un-satisfaction and manifest in lesser resource contributions. If the old technologies have been sold exceptionally well on global markets, then it might not be wise to cease their production to move towards new innovations. Even if the idea might be fruitful in the long term, the external pressures might not allow for the short term planning (Ibid, 47).

Applying the aforementioned theoretical models into practice cannot be done without first studying the military doctrines of those states which one wishes to analyse. Very important is to understand the presence and impact of nation's military culture, as well as the top-down or bottom-up principle in its civil-military bureaucracy.

2. DOCTRINAL CHARACTERISTICS AND IMPACT IN ISRAEL'S MILITARY INNOVATION

The theory of small states unpacks a principle of how various small countries focus themselves on certain clusters, mostly economic, to grow their capital and stay competitive in the modern world. This way, some small countries GDP per capita can comfortably surpass many bigger and richer states, even if the money actually comes from trading with those bigger states (Raadschelders 1992).

Israel is a small state with a powerful world class military specialization, personnel and technology. Its strong military culture is a by-product of almost century long struggle for existence (Katz, Bohbot 2017). The Muslim and Arab states that neighbour Israel by land are its fundamental enemies based on faith, ethno-identity and historical factuality. This reality, which goes far beyond any reasonable political negotiations, resulted as Israel being forced to engage in 15 different wars (overwhelmingly on the defence) since the birth of its nation in 1948.

This constant threat has forced Israel to become a world class military superpower in order to, primarily, deter its Arab neighbours from their confidence to attack once again. Creating, improving and maintaining its proper military doctrine has become the question of survival to the Israeli leaders as well as population in general. By this distinction the source of military innovation makes Israel a special case where multiple models, as proposed by Barry Posen, are seen at work simultaneously.

The constant intimidation from all state entities (neighbouring countries), as well as belligerent Islamic organizations (such as Hezbollah, Hamas and various Palestinian Liberation Institutions) has driven Israel to adapt to modern full-on state-to-state warfare, but also to attrition conflict. Thus, unorthodoxly for a small state, Israeli military doctrine had to balance all forms of its armed branches: army, navy, air force and Special Forces.

2.1 THE PRINCIPLES OF MACRO DOCTRINE

In order to properly structure their military, Israel has heavily relied on their very own and recent historical experiences of constantly being in a state of war. Despite developing a non-aggressive philosophy, early Israeli leaders understood that they cannot be a defending nation.

This means that Israelis will not hold back at the opportunity to capture strategic enemy land to stop further advances into Israel. This, however, is only done after they suspect an attack coming in the first place. In its past battles, Israel has very often won wars by heavily relying on information from its intelligence, as well as throughout study and knowledge of its opponents. Very crucial have been the ethos of its small state status and thus the lack of a buffer zone in case the enemy will win a battle and push on into the industrial centre of Israel. The primary doctrinal teaching was therefore the maxim that Israel cannot afford to lose any kind of war and never even a single battle (P.E. Gobry. 2014).

Despite the great capabilities and refined tactics in attack, Israel is still considered a peaceful nation that is not aggressive unless provoked. The defensiveness within the main doctrine is also reflected in the nomenclature of Israel's primal military division: the Israeli Defense Force (IDF). Even though the strategies used by the IDF were often very effective on the offensive, as they have invaded, captured, controlled and effectively held enemy land on multiple occasions throughout modern history, the idea to expand Israeli territory at the cost of aggressive neighbours was never considered. On the contrary, Israeli leaders have stated multiple times that the only expansion they would consider is into Israeli enclave of Palestine. Any other form of expansion would go against their statements regarding the legitimacy of all Jewish lands and in turn would likely cause a big backlash from many Western partner-powers (France, USA, Germany).

The idea of being a very powerful and reactive defensive military does, in some way, go contrary to their very unusual state motto called "En Brera" (Creveld 2008, 146). This motto is a civil-military teaching which in Hebrew means "no choice". It reflects an Israeli paradigm that every threat to a small nation, like Israel, is by default existential and thus any kind of response, no matter how severe, unproportioned and rapid is always justified. This way, the IDF has had many battle victories by applying the modernized version of German Blitzkrieg tactics to totally overwhelm the enemy on the battlefield and cause huge damage with very little losses. In modern military tactics, this balanced strategy of defensive combat combined with very clever offence is called 'manoeuvre warfare' and it is almost never used by small states for their lack of variety in resources and operational scale.

Uniquely to states with heavily ingrained military cultures, "En Brera" is not only a militaristic slogan, but a motto of Israeli state at large. It has an almost absolute support in both civilian population and military personnel. What adds tenor to Israeli militaristic culture

is the huge national pride that is shown by population towards its armed forces. Since the state has been constantly at war and generals very often have done everything they could to keep the order and promises to their population, the modern culture has been heavily impacted. The conscription rate for mandatory military service in Israel is verging around 80% of all eligible citizens. The gender balance is very close to 50% as women in military are highly valued with many co-ed battalions (female only units) being created yearly. There is a high public support for continuously high military spending, which in turn creates a very favourable climate for high level technological innovativeness.

Analysing the innovation within the Israeli military via the four theoretical models mentioned above can be tricky. The presence of the cultural model is clear, because the population actively seeks to contribute to the might of its military, by lively conscription rates and positive mentality towards its armed forces. Additionally, throughout its short history as a newly formed sovereign state, Israeli military has had a large part in its people's everyday lives. It was through active state defence by taking part in continuous wars (and effectively winning them). On the other hand, via the impact military had in shaping Israeli culture overall, especially because until recently it was still in its infant stages.

Interestingly, the doctrinal influence is being exerted in military draft as well. In order to maintain the singular social fabric, especially in such a tight and closed circle as country's military institution, the 'brotherhood factor' must be largely maintained. For this reason, Israelis do not allow recent immigrants and non-Jewish citizens into the military sector. As a result, out of Israel's 8.7 million population, only half of it are eligible to serve. Two groups that are left out are ultra-Orthodox Jews (Haredi) and Arab Israelis, who together make close to 40% of the population. Although military service is compulsory, the exemptions are made towards women who have little children, married women, people who are not physically or psychologically fit to serve or non-Haredi Jews who are otherwise highly religious and would prefer to do other community serving work instead (Elran, Sheffer. 2016).

In recent years, Israeli leaders have been pushing towards multiplying the options for young people and making it easy to avoid going through the military service if one does not want to do so (Jager 2018). This push is connected with Israeli idea of quality over quantity, under which the preference is to have a smaller, but very skilled military rather than high number of average soldiers. With less military personnel, Israel will have more resources to focus on those who are motivated to be in the army and thus develop better training platforms. Another

motivation is to keep boosting military innovation and cyber defence strategies. This is viewed as a bigger step toward future planning of self-defence and deterrence in constantly improving information era, far above having higher number of military personnel with out-dated technology. Using the example of USA, who as a big state can invest in both options, the contrast between state sizes can once again be traced to the small states theory.

2.1.1 DOCTRINAL IMPACT ON WARFARE STRUCTURE: STRATEGIC DEPTH, DETERRENCE AND MANEUVER WARFARE

2.1.1.1 Concept of strategic depth

The quintessence of IDF's teaching on nations defence is revolving around the fact that Israel has very small territory and thus, militarily it has no room to back into in case they lose a battle. This lack of a proper territorial buffer zone is called "strategic depth" (Kober 2010, 5). In a wider definition, it means the distance between nation's border lines and industrial core areas. The smaller the distance, the faster a state must react and think in order to not lose the war. Historically, many big states have lost battles on their border and then took time to regroup and reclaim what was lost. Countries with very even terrain or with very small territories have no 'strategic room' to fall back into. The concept of strategic depth also highlights the importance of proper protection of state's industrial zones, requiring their placement as much away from the potential hostile borders as possible.

This case is especially strong with Israel since they are surrounded with hostile nations, but also have an unstable enclave state of Palestine within its territory. Under the 'En Brera' doctrine, Israeli soldiers approach every battle with a 'must win' mentality (Cohen 2010, 28). Even with having an advantageous border terrain, Israel only stretches 82 km from West to East across Tel Aviv line. Despite using Palestine lands as a buffer zone against some of its neighbours, Israel still has to cope with the reality that their defences must be impenetrable, otherwise the industrial 'heart of the nation' will be destroyed fast.

This puts a great importance on deterrence, which is applied via the threat of nuclear weapons, superior military technology, elite level intelligence and the use of pre-emptive war to prevent threats from encroaching on Israeli territory. Additionally, such a state has to integrate a warfare structure, style and strategy that revolve around manoeuvre methods to

minimize its own and maximize enemy losses, as well as bolster confusion among hostile combatants. The fact that Israelis have great cooperation among all branches of its military makes most of this possible.

2.1.1.2 Manoeuvre warfare

Both classic and modern warfare methodology look into all possible ways of conducting warfare and building military to perfect one or multiple styles. Historically, famous examples are Blitzkrieg, attrition, trenched and proxy warfare. Considering the hostile reality, terrain, past military experiences and technological superiority, Israel's armed forces have perfected the method called "manoeuvre warfare" (Creveld et al., 1994. 1 - 2). Under this model, the nation combines all forms of its forces (navy, air force and army) to minimize own losses by avoiding direct confrontations via manoeuvring around the enemy in a tactical way. The idea is to strike an enemy in vital positions and at crucial moments to constantly keep them off balance and guessing. Before the fight, the strategy is to place own troops in the most favourable positions. In order to not let the enemy regroup into its strongest force, the pressure is put on all sides of the enemy's logistics.

The aforementioned 'brotherhood factor' adds inner respect inside the military communications and helps ease the difficult line of command linkages between its various branches, all capable of working like a single unit. For this reason, its army is highly regarded as one of the most balanced in the world. The singularity in the approach also serves as an important injector for tactical adaptability. Many lower and higher ranked soldiers often theory craft about military strategies and tactics, which provides a solid inflow of modern ideas to military implementers. Recent and famous example of that is the latest launched Dahyia doctrine (Khalidi 2015), which was originated by the currently highest ranked General of Israeli army, Chief of General Staff Gadi Eisenkot. Since then, for the past decade, the ground forces of Israel have been fighting mainly insurgent groups and a relevant way of conducting asymmetric warfare had to be launched. The logic of Dahyia doctrine aims to counter the commonly used and highly perfected tactic of belligerent combatants under which they use civilian infrastructure as a strategic cover-up and logistic stronghold. Since these tactics were highly effective in stalling and terrorizing NATO forces in Iraq, Afghanistan and Syria, the various terrorist organizations have developed them further to keep successfully implementing, specifically in those regions. The classic state-ran military is often very

ineffective in fighting prolonged warfare against paramilitary troops such as Al-Qaeda, Hezbollah and ISIS. The core problem of fighting an asymmetric warfare is the issue of distinguishing and separating enemy combatants from civilians among whom they hide. Constant policing and patrolling the civilian neighbourhoods often turns the same peaceful population on the policing military and they often can side with the guerrillas. Israeli response, via Dahyia doctrine, is to warn all local populations to not stay in the vicinity of terrorist combatants and then, hours later, sweep the areas clean, ignoring all kinds of infrastructure. This highly effective strategy has terrified local belligerents and until today they have not properly adapted to it. The same doctrine has been proven effective against the state of Lebanon in 2006 (Marcus 2015, 500). Lebanese villages on the Israeli border hosted their own combatants and let them attack, passing Israeli soldiers. As a counter, Israel sent a massive air strike to raze the villages without specifically selecting targets. The harshness of Dahyia doctrine, as well as its support from Israeli public can be traced back to a wider philosophy of 'En Brera'.

2.1.1.3 Deterrence

Another neo-defensive military doctrine, which is aimed at discouraging the enemy to attack in the first place, is called deterrence. The main idea of deterrence came up among big states and appeared in the 20th century with the emergence of nuclear WMDs (Dunn 2007, 5). The mutually assured destruction has been the vanguard for peace among two hostile states that both possessed the atomic weaponry.

In today's multipolar world, the nuclear weapons technologies are more widespread, diverse and available. Israel is believed to be among the nine nations that have been confirmed to possess the nuclear arsenal (Davenport 2018). Even more than that and despite classified information, Israel is suspected to be part of Nuclear Triad, which is a term used for nations capable of launching atomic weapons from air, land and sea. The other four states that are part of the Triad (Russia, USA, China and India) are all big states. This fact adds extra layer of ambiguity to Israel, which includes the 'unknown factor' as extra sign of deterrence for their neighbours to think about (Kristensen, Norris 2014, 103).

Despite past success in defensive warfare, Israel still faces many geopolitical troubles in conducting war on its territory, as well as across the borders. To be sure in its deterrence

doctrine, Israel cannot only rely on its possession of WMDs, especially since many of its neighbours might also possess it sooner than later. For this reason, nuclear weaponry is not the only way Israel is using deterrence on its adversaries.

It is known that Israel possesses the most advanced Missile Defence Systems (MDS) in the world (Katz, Bohbot, 2017. 108, 164). This means that, despite having powerful offensive capabilities in its region, Israel's ground forces and cities are almost impenetrable from the air attacks, including missiles. With the possession of the most modern MDS -Arrow, David's sling and Iron Dome- (Ibid 145 - 147), the Israel guarantees itself another layer of deterrence from hostile attacks. It is unlikely that any neighbouring Arabic nation will dare to launch an air assault against constantly activated, set and on lookout air defences of Israel.

The third deterrent is an overall highly up to date military machinery and weaponry. Compared with another regional superpower, Iran, Israel has much less planes, helicopters and tanks. However, most of these machines used by Iran are decades old, built between the years of 1960-1980. Israel meanwhile updates and maintains its machinery every 10 years, more on Israeli air force modernization and world class pilots.

The fourth deterrent for neighbouring Arab nations is Israeli 'first strike' principle (Kober 2003, 152). In past wars, Israel never waited enemy to attack before retaliating. Whenever it sensed that the enemy is approaching or got clear insight from the intelligence, it immediately attacked first. This often led to catastrophic losses on enemy side, with close to zero compensation. Since Israel has much better offensive and defensive weapons today than in the past, the fear of, once again, provoking the first strike, is bigger than before.

2.1.2 BOTTOM-UP PRINCIPLE OF SOLDIER AUTONOMY: ROOTS FOR INNOVATIVE MINDSET

Israel not only tops the list of the most innovative countries, but also has one of the most innovative militaries in the world (Katz, Bohbot, 2017, 7-8). Their difficult past has forced them to persistently adapt to the constantly evolving world markets and to learn how to solve challenges on their own, without waiting for global trends. Some experts argue that the innovation which thrived in the military sector spilled over to the civil society and benefitted the country as a whole (Broude et al. 2013).

Researching the roots of Israeli military innovation, the most unusual but commonly mentioned trope is a special kind of military education interaction principle, called the "bottom-up doctrine" (Marcus 2015). Under it, the whole model of Israeli military is based on the inflow of talent and experience from bottom to the top. Every high ranking General had to, at some point, be a regular soldier and have a direct battle experience, contrary to being a pure bureaucrat. The philosophy of such a doctrine is to not allow, via the events of luck, corruption or otherwise, an incompetent person to gain access to high military positions and to give wrong orders to lower level military units.

Part of the bottom-up doctrine is a certain "soldier autonomy principle" (Ibid, 524) which encourages free form of communication between high ranking generals and normal soldiers. By this principle, every soldier can freely address his superior and without fear of punishment share his ideas on the battlefield situation, as well as his take on what is going right or wrong. The friendly atmosphere inside Israeli army is largely due to this principle. The root of it came from early 1960s Special Forces battalion, which was led by the legendary Israeli commander Ariel Sharon. Sharon encouraged his men to constantly communicate, give ideas, propose changes and analyse what is lacking for better results (Ibid, 505). His ideas were later institutionally applied to every branch of the military. Every best idea proposed by soldiers was then sent to high command where many footprints for new technologies were being drafted. The individuality of every soldier as well as autonomous and innovative thinking was thus reinforced by the very nation. Even more, the bottom-up principle allowed many soldiers to rise in rank by making it impossible to climb the military ladder without being exceptional at lower levels (Ibid, 507). The principle of soldier autonomy also ensured that every general had absolute respect from normal soldiers, since he at some point was one of them. The core of bottom up doctrine was thus to reward the soldier initiative by commanding him what to do, not how it should be done.

In modern times, the institutionalization of bottom-up doctrine emerged in the face of military specialization schools (including specialization in cyber defence) (Breznitz 2010, 41). Israel is one of the first militaries to have a unique sniper and pilot schools, thus having one of the best specialized soldiers in the world. Additionally, since Israel is surrounded by Arab nations, they study Arabic war tendencies and try to pick apart their strengths and weaknesses in attack and defence.

Another crucial aspect of the Israeli specialization schools is where they gather their source material. There is a system of experience analysis called "Knowledge Management" (KM) (Ibid, 512). Under the doctrine of informal communication, many soldiers who were in combat can pass their input to units expected to have the same experiences. One of such methods is an institution called After Action Review (AAR), which provides debriefings after successful missions (Ibid, 513).

NATO has a similar system called CALL (Centre of Army Lessons Learned), but it differs from Israeli. Contrary to CALL, Israel's KM appoints a Knowledge Officer (KO) who is part of combat mission, but whose secondary mission is to study the battlefield behaviour of both enemies and own troops. The KO later debriefs the results to high command and many lessons will later be applied to military education. The CALL, on the other hand, has a team of experts who monitor the war from afar, not taking part in any combat. After many months, the team publishes a report on their findings (Ibid, 515-516). The biggest difference thus is the fact that under KM, every soldier can give his input and the final summary will be made immediately after the battle, thus learning is being part of the battle itself.

The bottom-up doctrine highly encourages every soldier to think individually and to be innovative in solving problems both on the battlefield and outside of it. For this reason, many soldiers who decide to leave the military try themselves in civilian business environment and often end up owners of successful businesses. Maybe it is not coincidence that with such high conscription rates and strongly ingrained military culture and encouraged individualistic thinking, Israel is ranked fourth in start-up businesses (StartupBlink 2019 Rankings).

2.2 INNOVATION INFLUENCE AND RESULTS

The huge impact military has made on Israeli human capital is a very interesting phenomenon. The military culture, various doctrines of warfare, individualistic thinking as well as country's dangerous geopolitical position have created a pivot inside the Israeli society to constantly look for better ways of conducting their everyday lives. One of their most famous entrepreneurs, Tzahi Weisfeld, says that the spillover effect from military happened because the public was used to work under pressure (Weisfeld 2015). With constant hostilities forcing military to innovate, some people found ways to apply those ideas in the civil fields.

Engineers who developed weapons found ways to use some techniques in high-tech or start-up companies (Broude et al. 2013).

Furthermore, Israel's bottom-up doctrine can be seen in their development of military weapons and gadgets. Contrary to NATO, the IDF actively seeks for soldier's input regarding which technologies need to be implemented in order to be useful on the battlefield. The weapon architects of NATO come up with designs of proper implementation after the fact, when the technology is introduced. Good example of that is the recently introduced Injured Personnel Carrier, which Israelis developed after one of their female soldier struggled to carry a male partner out of combat. The special back-belt was thus developed to avoid such situations in the future. NATO's troops, on the other hand, use much heavier equipment because their designs came prior to the infield soldier feedback (Leichman 2012).

In addition, Israel is the seventh largest arms exporter in the world (SIPRI 2019). The high status among various clients puts more pressure on Israeli weapon industry to keep its goods up to date. Largely thanks to this mentality, Israel has developed such famous and well known weapons as UZI, Desert Eagle, Galil etc. In addition to Missile Defence Systems, Israel is also producing the most advanced military drones in the world (Katz, Bohbot 2017).

The arms industry plays a large role in Israeli R&D, as well as majorly contributes in economic balance of trade cycle to keep the country's GDP constantly on the rise. This helps Israel to counterbalance their relatively high annual military spending of 4,7 % of GDP (World Bank 2017) by having a harmonized system of money inflow via selling the weaponry mostly to Central Asian states (Haas 2018).

Opposite to the conventional technological advancements, Israel is also heavily involved in developing various cyber technologies. The primal focus, staying consistent with their macro doctrine, is to defend the country from massive cyber-attacks, which according to Interpol, is the biggest threat of the modern age (Interpol 2019).

Parts of Israel's cyber security are various programmes, which focus on training the personnel to become professional cyber-space experts from the very young age. One such program is called Unit 8200 and according to some sources, the main workforce there is teenagers between the ages of 18 and 21. Heavily financed and supported by Israeli Ministry of Defence, Unit 8200 is the biggest part of nation's military intelligence, which monitors and decodes enemy communications. Young people that are part of this unit are chosen for their

phenomenal understanding of computer science and serve there under their military duty (2-3 years) (Behar 2016).

Another program which is called Centre of Computing and Information Systems (MAMRAM – Israeli acronym) is part of the IDF's technological sector within the military IT sphere (Breznitz 2010, 33). MAMRAM uses a large central computer to act as a closed system network that processes all data on technology and armaments. It also specializes in computer abuse enforcement to monitor cyber vandalism within Israeli territory.

Throughout its short history as a state, Israel has shown incredible consistency in staying true to their belief, even in rapidly changing global technological environment. They constantly adapt and use every possible tool to properly steer their course and national grand strategy in the right and most beneficial direction. Even with the extremely difficult geopolitical situation, Israel still manages to majorly contribute to the global innovation systems and despite being one of the most military-minded nations in the world, accomplishes to successfully educate a free thinking population.

3. ESTONIAN MILITARY DOCTRINE

The main focus of Estonian military doctrine primarily falls on defensive military operations. This is being done in collaboration with neighbouring states, NATO alliance, as well as within its own military associations and branches. Distinctly to other small states, Estonia has very vocal and regionally uncommon military presence. For a small post-Soviet republic, it has a particularly focused military individuality. Unlike any other small state in Europe, Estonian constitution foresees the mandatory military service of all physically able bodied men to serve for 8 or 11 month period, after which they will be registered in a reserve list to be drafted if needed (EDF 2014).

According to the Estonian definition, the basis of its military doctrine is set in the evaluation of the following four factors: 1) National defence goals; 2) Threat analysis; 3) State resources; 4) Historical experiences (Mõts 2010, 25). The main defensive goal for Estonia is the survival of the state together with its sovereignty. The threat analysis is almost fully focused on its only recent historically aggressive neighbour, the Russian Federation. State resources, despite being carefully managed, are still lacking in comparison with many larger states. This forces Estonia to ultimately be a non-aggressive nation, since it lacks the first strike capability for proper offensive strategy and theory crafting (Veebel, Andžāns 2017, 39).

As military history of a country plays a big role in its doctrinal developments, so it does for Estonia. The modern approach in Estonian military paradigm is a mixture of three relevant and proportionately recent militaristic experiences. The first characteristic is rooted in the pre-Second World War era of Estonian first strategic self-evaluations and war experiences. The main value here was the successful Estonian independence war against early Soviet Union, which allowed Estonians to better comprehend their geography and national fighting style in order to further improve their military tactics. The consequent 'forest warfare' style, which Estonia has deeply perfected, has thus come directly from the era when the country faced its most recent existential threat (Flangan et al 2019, 6-7).

The second characteristic was introduced by the post-Soviet Estonian soldiers who served well within the Soviet Union and were highly valued military leaders when Estonia regained its independence in 1991: "When we started, early 90's, there was nothing, and the entire leadership, as much as we had it at that time, was overwhelmingly Soviet trained which meant that we started to generate doctrinal staff from a kind of mixture of Estonian doctrine prior to The Second World War and Soviet cultural domain." (Appendix 1). These people, many of

whom were Afghanistan war veterans, were highly experienced and educated in Soviet fighting styles and their knowledge was vital in early 1990s. In addition to being familiar with most of Soviet machinery, which was left behind by the leaving Russian troops, the Soviet-era Estonian soldiers fused together various tactics in attempt to revitalize the newly independent Estonian military apparatus. The smallness of the Estonian state, together with very passionate and positive political movements toward properly rebuilding the country worked positively to help adjust the newly designed military models (Ibid).

The third characteristic came from joining the NATO alliance in 2004. This immediately added an extra layer of security in the form of collective action. Ultimately, many Estonian soldiers and generals also got more opportunities to go abroad and learn Western tactics to later implement at home (and to use them in practice together with the allied troops in training operations). Despite being very beneficial in military developments, the biggest reason for joining the NATO was further solidification of Estonian security against its biggest neighbour, Russia: "From the Estonia's perspective, what we are striving for is the security. That's the aim. NATO is not the aim, is a mean. (…) NATO, as organization, is a huge benefit in terms of security and it is influencing hugely what we are doing in the state defence for many reasons." (Appendix 1). Since Estonian policymakers view Russia as the only potentially aggressive state, the pragmatic evaluations move towards realistic understanding that there is a major power mismatch between the two countries. Joining NATO was thus of vital importance to ensure the maintenance of Estonian sovereignty.

By joining the NATO alliance, Estonia also joined the world's biggest security community, which for a small state gives an element of deterrence as well. The article 5 of NATO Charter clearly states that if an external force attacks one member state, then it will mean the same as attacking all of the NATO members as a whole, which will bring a total retaliation from everyone inside the alliance (NATO Charter).

The combination of the aforementioned three characteristics has put a start to the emergence of the Estonian military doctrine. To this day, the full scope of which is very indistinct, but also the doctrine itself is still in its development stage (proto-doctrine) (Appendix 1). Only with recent Russian aggressions against Georgia in 2008 and against Ukraine in 2014 the Estonian military policy makers started to really push for more focused strategic guidelines to be demarcated in country's proto doctrine (Veebel, Andžāns 2017, 34).

It should be noted that the EDF has been actively using the NATO's STANAG (Standardization Agreements) to fuse together and improve the Estonian military model: "NATO has a great library of doctrines and Estonia can use it. EDF has been using NATO' STANAG as a kind of common ground" (Appendix 1). This has also helped Estonia to better develop its own doctrine, since from the very beginning the operational and strategic levels have not been highly advanced. According to some experts, Estonian tactical standards are very good, but the strategic and macro-operational levels still need to be majorly improved: "Estonia lacks experience to finalize things at the operational and strategical level in the military. Tactical level is very good, title proved, but again, if it to consider the operational and strategical level, there is way to go." (Appendix 1); "If we are talking about a grand strategy, we do not have one (…) Do we have a tacit strategy? Of course we have, but tacit strategy is not effective. Why? Maybe because we do not have enough strategists assisting the government. (…)We have to deliberately educate and produce strategists." (Appendix 2).

Among the difficulties in making a proper military doctrine lies a certain disagreement of Estonian military academics. There is a deep divide in strategic understanding of the military division, which resulted in the appearance of two schools of thought on the subject. The first school presents that, with the limited financial resources, the focus has to be placed on giving maximum possible training to a limited number of soldiers. The second school of thought argues that any person who knows how to handle a gun can be classified as a soldier capable of defending his nation. The second school thus defends the current military model of having both professional army, but also much larger reserve troops (Appendix 1).

To show itself among the most exemplary members of NATO, Estonia show itself as an active state. It fulfilled the needed contribution of 2% of Estonian GDP to be allocated to military expenses, it willingly contributes to various military operations with other NATO members, it has built bases and openly hosts NATO troops on its territory and some of its most elite troops participate in various peace and combat missions abroad (Somalia, Afghanistan, Iraq). Furthermore, in 2009 Estonia became the biggest contributor to the ISAF (International Security Assistance Force) when the number of the serving Estonian soldiers was the highest in relation to the number of inhabitants of the country (Veebel, Andžāns 2017, 37-38).

In opposition to how most of other NATO member states operate, Estonia does not only rely on its alliance for military protection. Its reserve army is proportionately quite high if one

considers the relatively small population of the state. Unlike countries like Latvia and Lithuania, who abolished the mandatory military conscription after joining NATO and in turn switched towards smaller, more focused, volunteer-based professional army, Estonia never stopped relying on their own identity in training their troops in its own national defensive style. The main reasons for that are certain ambiguities of Article 5 being fulfilled by every alliance member if Russia is to attack its Western neighbours. Despite NATO's Enhanced Forward Presence (NATO factsheet 2018) in Baltic region giving extra assurances in the deterrence policy, the fact that there has not been a clear precedent of Article 5 in work against non-belligerent state is alarming. Various forums and discussions on that topic have often concluded in different results and thus the NATO deterrence dilemma started to emerge (Taylor, Birnbaum 2016).

Being the keepers of NATO's easternmost border, the three Baltic States rely heavily on alliance's military solidarity. Primarily because the 'Baltic line' is viewed as an external border between alliance's friends and foes, the non-zero-sum game mentality with clear cooperation and communication is the key to keep confidence in NATO and thus strengthen the belief in the collective defence. Estonian military model is thus built around close cooperation with NATO, with heavy emphasis on trust toward the Article 5 as deterrent against potential Russian attack, but also in raising its own military capability to work independently in order to guarantee maximum resistance in times of crisis (Mõts 2010, 7-9).

3.1 ESTONIAN MODELS OF MILITARY INNOVATION

With Estonian military doctrine still being in its developmental stage, the country itself is positioned favourably toward clear overall progress. Estonia is ranked highly among the most innovative countries in the world (Global Innovation Index 2018). Its IT industry is very competitive and well known for its rapid growth in recent years. Being a small country, Estonia has very successfully found a way to collaborate every part of its society to work in unison. As a result, a comprehensive approach towards state defence was applied.

The principle of 'comprehensive approach' highlights that the whole state has to function in harmony and do its part in good faith in order for the military to also function well and thus defend the country to its best capacity. With healthy civil society, good political balance, rapidly growing economy and well maintained military, the country will operate well on most

levels. Previously, the term "total defence" (Veebel, Ploom 2018, 7) was used. It meant a certain psychological, economic and psychical readiness of the state and its municipal institutions to be prepared to fully mobilize their resources in times of crisis or war.

Within NATO, the 'comprehensive approach' is defined as civil-military cooperation under which crises are being managed via political, civilian and military instruments simultaneously (NSO NATO 2017).

Having reserve based military force, fair financing towards military sector (2% of GDP), internationally experienced soldiers, well working alliance and uncertainty with historically unfriendly and powerful neighbour, Estonia has all the criteria to mould its own national military doctrine to fully focus on improving its military further. Even with doctrine being in its development 'proto' state, the two predicting models of military innovation can be clearly seen in Estonian society today.

3.1.1 The civil-military synergy of Estonian society

The Civil-Military Model of military innovation is very transparent in Estonian society. Military affairs are taken seriously by the public. The annual parade is being widely celebrated and high ranked generals are looked upon with high esteem and respect. The general public shows a lot of pride towards its country's military history and the victory in Estonian war of independence. All of it helps raise the nation's awareness towards the importance of the 'comprehensive approach' in the affairs of national security.

During the victory parade of Estonian 100 year anniversary in 2018, the High Commander of the Estonian Defense Forces, General Riho Terras said: "The knowledge and intelligence of the Estonian people have to be used to the fullest in order to best defend our nation. Estonian defense force has to look into the future and know how to use the advantages of its people and its country. Our [military] innovation is being carried forward by the Estonian society as a whole" (EDF 2018).

The similar point as stated by General Riho Terras can be read from the Estonian National Defense Strategy (published by the Ministry of Defense). It states that the security is a broad concept and that every part of society (both military and non-military) has to do its share in keeping the nation secure. To further proof the civil-cultural involvement in military affairs,

according to polls in 2017, 93% of Estonians supported the mandatory military conscription model that Estonia operates on (Veebel, Andžāns 2017, 35). The idea that national defense should be a joint task of the entire society is heavily supported by 78% of the Estonian population, with only 6% thinking that this should be a purely military endeavour (Veebel, Ploom 2018, 1). Thus, with these notions, the 'comprehensive approach' was added only in recent years and is currently still being mixed into the model of classic territorial defense, provided by the military. The combination of all these principles is viewed as an increase of the Estonian military value in terms of resilience and deterrence (Veebel, Ploom 2018, 6).

Other than receiving military support from NATO troops, Estonia also actively improves and maintains its independent defense capabilities. In addition to full scale reserve based army there is also a very active presence of Estonian Defense Union (Eesti Kaitseliit), which is a volunteer based civil-military organization that provides a platform for every Estonian citizen who wishes to take part in various combat training missions and personally contribute to Estonian defense, without being directly involved with Estonian military (Kaitseliit 2019). For such model to exist, the civil society must be actively (both vocally and by participation) supporting its military and paramilitary organizations, which further solidify the civil-military model in Estonian state.

3.1.2 Innovation as a result of cultural determination

The global cyber identity of Estonia is directly derived from its intrastate IT culture. The Cultural Model of military innovation can be clearly seen as present in the Estonian focus to develop its human resources. During the Estonian Military Industry show week in 2018, General Riho Terras said that the Estonian population is small, hence there is immense pressure and need to educate and push the population to be innovative and produce useful technology that will push the country forward, militarily and otherwise (EDF 2018, interview archive).

The Estonian military innovation is heavily focused on defensive technologies within the cyberspace. Until now, mostly all of the innovation has gone towards cyber-defensive capabilities that also benefit the NATO alliance. The Headquarters of NATO Cooperative Cyber Defence Centre of Excellence was established in Tallinn in 2008 (CCDCOE 2019). It immediately received full accreditation and International Military Organization status. The

organization deals with improving the models of cyber security with heavy emphasis of protecting the encryptions of top-secret national information (Ibid).

Additionally, since 2017, Tallinn also hosts the headquarters of the European Union Agency for the Operational Management of Large-Scale IT Systems in the Area of Freedom, Security and Justice (eu-LISA). Thus, Tallinn is unofficially titled the 'E-capital of Europe'. However, on the downside, the Estonian military cannot afford to invest in research and pay high level salaries to IT experts working in local military organizations (Appendix 1). Interestingly, many high level cyber experts contribute to developing Estonian cyber programs from their own personal time and often free of charge (Ibid). Additionally, this opens the door for civil-to-military spillover effect of high level technologies.

For being such a small state, Estonia has relatively big military industry. With heavily lacking of human resources, Estonian military industry continues to produce various unmanned military technologies such as drones and distantly-controlled combat vehicles (Aasma 2016). The Estonian Ministry of defense even made a National Defense Development Plan (NDDP), which sees Estonia being exporter of various combat technologies by the year 2026 (Raud 2018, 8).

In the past ten years, Estonia has established organizations such as: Department of Defence Industry and Innovation, Defence Investments Agency (DIA), The Estonian Defence Industry Association (EDIA), The Estonian Defence and Security Industry Cluster (EDSIC) and The Centre for Applied Studies at the Estonian National Defence College (Raud 2018, 9-10). The active support in founding such organizations and branches clearly shows the institutionalization of the Estonian national paradigm shift towards military innovation.

3.2 FINDINGS AND COMPARISONS WITH ISRAELI MILITARY MODEL

Despite similarities in certain thresholds of macro military mechanics (military economy, service model) and state size, the Israeli militarized society is still majorly ahead of Estonia. Because of the harsh geopolitical climate, the military innovation was never a choice for Israel, as it has been for Estonia: "Despite all the fairs, Israel has had many wars. We (Estonians) have been voicing our concerns all the time but in reality we haven't had a war, and this absolutely is a factor. Why innovation, why do we need it? Is innovation necessity or is it just a choice? In terms of Israel, I would argue that for them it has been a necessity. For

Estonia, well, I would say choice." (Appendix 1). The Israeli 'En Brera' doctrine clearly puts forward the necessity of survival above any moral dilemmas a nation and its soldiers could possess. With having the power of first strike potential, Israel will most likely always go for the aggressive deterrence strategy, which is much different to how Estonia would act.

In Estonia, the situation of strategic development has been the opposite. Ever since joining the NATO alliance, the concept of dialogue has been ever present in Estonian military strategy. The "sectorialized" (Veebel, Ploom 2018, 11) approach to various threats, despite being well developed, can still lack in many categories. The response towards various new crisis scenarios will most likely not be violent. The motivation will likely be to wait for the aid from its allies, show resilience and stall the conflict.

From the perspective of militarization of society, there are some similarities, but also a major difference. With high participation in the National Defence League (Eesti Kaitseliit) and Estonian law allowing its citizens to possess weapons, both states seem to be on equal footing. However, Israeli society shows bigger pragmatism, mainly because of its daily threat in dealing with terrorist organizations and unlike almost any other small state, Israel uses very harsh methods in keeping the daily violence in check: "Israel is a highly militarized society. We are not at that level and this would be the biggest difference. In Israel, almost everyone possesses a weapon. With the modern terrorism now, there are people in society who can resist and act very quickly." (Appendix 2).

As for the military culture, Estonia is more conservative in that regard. Its command chain is classic top-down principle in every sense. Classic hierarchy of command chain is applied in every military branch. The respect factor towards soldier experience is mostly directed towards those who have server abroad or otherwise actively participated in various international conflicts (primarily within NATO framework). Many Estonian military experts agree that Israeli model of bottom-up principle of military framework could be very useful if it would be applied in Estonia (Appendix 1,2,3): "To stick with a concrete example (taken from what you have described) is this relationship between superiors and soldiers (bottom-up model). This is something we have kind of tried in principle to implement here as well but with bigger or lesser success. But I do fully subscribe to this Israeli concept and I think it will work here as well." (Appendix 1). Unfortunately for that to happen, the system together with the doctrine needs to mature further.

The concept of soldier experience is also divided between the two countries. In Estonia, many Generals started their careers with relatively high military ranks as soon as they finished higher education. In Israel, every General must go through a soldier phase, which will give him higher understanding of ground-level military dynamics, but also will raise his respect among his peers and subordinates.

Another interesting similarity is the focus-based adversary preparation in both Israel and Estonia. Israeli military is fully focused on and set up to be effective in anti-Arab warfare. There are military schools that teach Arab tendencies in various types of combat (both hybrid and standard) in order to further specialize its solders to be ready for every type of crisis scenario. Estonia has something similar, with heavy specialization on Russian combat specifics: "(…) in our case, the main threat comes from Russia, so our doctrine is based on studying Russian hybrid and overall doctrine." (Appendix 2).

Taking the innovation models into considerations, the biggest difference comes from the source of technological and innovative spillover effect. In Estonia, the society carries the military forward. This mostly comes from the military lacking money to hire high-end IT specialists to forge a proper purely Estonian cyber-sector. Fortunately, the military solidarity within the Estonian society is significant enough that many people contribute to military developments from their own free time: "There is something very good in Estonia which I would really think is unique for us. We have generated a cyber-unit which is comprised of volunteers. They are working every day in banks, IT companies and they are very good and they are coming every day in their free time and contribute to the state defence. And that is truly innovation! Generating with a very little input, a very big output! One has to find where the common interests are." (Appendix 1).

In Israel, the spill over effect mostly comes from the military side (Breznitz 2010). Since the Israeli military industry is among the fore leaders in the world, the financial side is much more secure and steady than it is in Estonia. Also, since Israeli civil-military relations are very tight, the military sector impacts almost every branch of its country. Additionally, unlike in Estonia who hosts multiple cyber-warfare institutions, the Israel has its very own ones (financed by the Israeli state) (Breznitz 2010). This is important since it adds to Israeli military secrecy and ambiguousness, which all work as an extra deterrent for their adversaries when they consider the offensive.

CONCLUSION

The main argument of this paper is the idea that Estonian Defence Forces can show more effectiveness by analysing and adapting elements of Israeli military doctrines. In order to prove the stated argument, the author has conducted the case studies of the Estonian and Israeli Defence Forces and compared their current doctrines. In addition, the author sought to detect any kinds of military innovation within the two nations. Studying the definitions, it became clear that the concept of military innovation should not be conflated with the usual definition of what constitutes it, but as something more nuanced. To outline the premise of the research, the author used the four theoretical models of Barry Posen as the main framework to properly illustrate the possible cases of what can stimulate a proper innovation inside the military.

As analysed in the second chapter, Israeli Defence Forces possess multiple developed doctrines with effective and well-established principles. As it historically has been in a continuous state of war, Israel has learned how it can properly adapt its military by constantly improving its strategies, tactics and operations in accordance the capabilities of its enemies.

On the other hand, the Estonian army is part of the biggest military alliance in history (NATO). Despite this, the Estonian society still actively supports its own national military capabilities via the conscription-based model of reserve army. The main advantage, but also challenge for Estonia is therefore the ability to choose and mix both its own, as well as NATO's military doctrines. This, together with still moderately recent independence of Estonian nation is contributing to the problem that Estonian doctrines are still being in their development (proto) stages.

From the point of view of military innovation, the main finding of this thesis is represented by the fact that Israel has no choice in the matter. It has to either innovate and be superior in combat (strategically, tactically and technologically) than all of its neighbours combined, or accept that the very existence of its state is under direct threat. For Estonia, the results are different. The main finding is that the innovation in Estonian military is still a choice. The author finds this fact alarming, because the only threating neighbour of Estonia, Russia, has been always present and continuously possesses a very highly developed army. As stated by one of the Estonian military experts: "Estonia alone, or even together with the Baltic or Nordic states, is still no match for Russia." (Appendix 3).

Despite high support from NATO, Estonia still feels the need to figure out its own unique place among its allies. The closest it got to establish its own niche is the cybersecurity domain, in which Estonia hosts the headquarters of the biggest IT organizations of NATO and EU (CCDCOE and eu-Lisa). On one hand it is positive, since being in the very centre of such organization gives Estonian specialists valuable experiences to further develop in the areas of cyberspace. Yet, the biggest benefit would be to one day find purely Estonian cyber defence organization, which would not rely on foreign funds and could only be accountable to Estonian state. This way the innovation could be stimulated within the nation and no directives and constrains could be placed to hinder it.

From the above point, it can be deduced that Israel, being on its own, can focus its mentality towards innovation much better than Estonia, since being part of an alliance places extra weight by various directives and formatives which must be followed: "Israel has the resources and the pressure to find ways to innovate and to address the security risks. Estonia, being a member of a well-established alliance, has to play with that book which is something that probably limits the innovation or makes it much longer to be processed through the triangle framework of NATO." (Appendix 3).

The main finding which supports the initial hypothesis is that Estonian military could be restructured in Israeli principle of bottom-up command-communication. From all the conduced and very constructive interviews held with Estonian military experts, the author has received almost unanimous agreement that Estonian top-down model might be outdated. Additionally, the developments within the military can give a real technological boost to the society as a whole, as is the case with Israel. The spillover effect of strong military culture and high citizen involvement practically, intellectually and emotionally has highly impacted the Israeli nation on every level. For Estonia, the spillover effect is happening from the other end. Since the military lacks financial resources in hiring high level professionals to develop its various systems, the supportive citizenry often helps by contributing for free. Theoretically, this only works if either the cultural or civil-military models of innovation are present in the society.

In terms of future research recommendations, the author proposes to look at the issue from purely technological level. Studying the differences and similarities of military industries could help bring forward more distinct models of military innovation such as intraservice and interservice. These two models were not immediately obvious in small states like Estonia and

Israel. For Estonia, the reason is likely the lack of extra financial resources which these two models view as the cause for competitiveness. And for Israel, the high presence of military culture together with highly doctrinal brotherhood mentality would go against finding proper ways of engaging in any kinds of military competitions.

Regarding the research on how doctrines can shape the success of the modern armed forces, the results came with slight variation. For Estonia, the military success, at least at the current stage, cannot be fully defined. That is because its doctrines started to actively be developed within the past decade. With the combination of intrastate tactics together with doctrines implemented by the NATO, the large chunk of doctrinal concept within Estonian military could be beneficial to revise. The doctrines of Israel's military leads the full nation to be military focused and aware of how important the defence of the country is. The issue is directly existential. From that angle, the Israel has an "En Brera" doctrine which spills over to every corner of society and is actively used as a unifier. The clear strategy, active tactics and operations, as well as strong military culture built within the IDF all stems from the doctrinal teaching that, in times of war, the gains are irrelevant, but the loses will be absolute and final.

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APPENDICES

To better understand the aspects of innovation principle within the doctrines of Estonian Defence Forces and to gather more detailed information for the research, the author conducted three interviews with military experts of EDF. Their names will stay under anonymity, as requested.

Appendix 1.

Date: May 3rd, 2019

Location: Tallinn

Among the questions addressed:

1. Estonia proved itself to be a serious military planner, as it is in the top three NATO states to reach the necessary 2% GDP threshold (NATO 2018). Opinions seem quite divided when it comes to the amount Estonia spends to invest in military. What do you personally consider? Is the Estonian population overall aware and educated about the fact that investing in military while having a threatening neighbour, even in peacetime, is worth the price?
2. Innovation is present in almost all the sectors in Estonia. Also connecting with the previous question, the country invests 2% of its GDP in military. What are the reasons innovation does not surface so prominently in the EDF? How is innovation in the military sphere perceived by the EDF?
3. Being part of the NATO, Estonia has military practices in line with a collective mentality of defence and it is bounded to an alliance. Is that fruitful for the Estonian armed forces? What capabilities would Estonia need that would add most to its independent territorial defence ability? Would Estonia benefit from more military innovation if it changes its mindset closer to the states relying primarily on independent defence capabilities? (a close example could be Finland here).
4. How would you describe/ what is characteristic about the current Estonian proto-doctrines?
5. Can Estonia apply Israeli experience with the role of military doctrine in general? And specifically carrying over some elements? If yes, how can it impact innovation within military?
6. Currently, Estonia is under a big development plan, with a length of 10 years (National Defence Development Plan 2017-2026). One of the main goals of this plan is to establish the cyber command and this can be connected on the innovation side. Is this the military niche Estonia is in need now? Could the Cyber Defence branch make Estonia the front runner

among NATO states/ in general? What could be the challenges in this process? Is it possible that the integration and development of the cyber domain be enhanced by establishing an appropriate doctrinal basis?

Transcript, record and name are available upon request.

Appendix 2.

Date: May 6th, 2019

Location: Tallinn

Among the questions addressed:

1. How would you describe/ what is characteristic about the current Estonian proto-doctrines? I've understood that EDF stays very good at the tactical level, but at the strategic one not that well. Is this statement accurate? If yes, what is lacking in terms of strategy?
What are the current plans to actually reach the stage of having a good strategy?
2. Can Estonia apply Israeli experience with the role of military doctrine in general? And specifically carrying over some elements? (examples) If yes, how can it impact innovation within military?
3. What are the general military system differences between Estonia and Israel that need to be taken into account when attempting to transfer the Israeli experience with military doctrines and innovation?
4. Since it has been created, Estonian army has not experienced a single war on its home ground. What is the present state-of-mind of the Defence Forces while being in peacetime? Is Estonia 'taking advantage' of being in the peacetime to prepare for the wartime? (Israel as comparison here).
5. EDF has been buying arms from various countries (Germany, Israel etc.). What conditions should be met in order for Estonia to become a producer of its own weapons? Is it a realistic aim? What are the benefits and possible risks?
6. It seems that EDF lacks coordination and cooperation between policymakers and the defence industry. Also, innovation within EDF doesn't seem to be surfaced prominently. Is this description accurate? If yes, could this lack of cooperation be considered one of the main causes of innovation being delayed in the EDF?
7. Do you agree that EDF is very good at tactics, that tactics is the key at the moment?

Transcript, record and name are available upon request.

Appendix 3.

Date: May 8th, 2019

Location: Tartu

Among the questions addressed:

1. Israel, like Estonia, is a small country. Because of that, Israel is aware that in case of attack, they lack a proper territorial buffer zone and they have developed very smart tactics and strategy (strategic depth concept). Is EDF aware of this same thing? How is it taken into consideration?
2. One factor which has led IDF towards an innovative mindset is the external pressure. If we think about Estonia, this can be applied also, as there is a threatening neighbour. Still, EDF does not seem to have this innovative mindset implemented yet. Is this statement accurate? If yes, why is this happening?
3. Can Estonia apply Israeli experience with the role of military doctrine in general? And specifically carrying over some elements? If yes, how can it impact innovation within military?
4. What are the general socio-political differences (structure of the society, politics etc.) between Estonia and Israel that need to be taken into account when attempting to transfer the Israeli experience with military doctrines and innovation?
5. Looking at the Israeli experience with the bottom-up innovation model, would it be potentially beneficial to Estonia? What aspects of Estonian military culture support and hinder it? Could it be beneficial for the civil society also (as Estonia has a reserve army)?

Transcript, record and name are available upon request.