

**A Revolution of Democratic Warfare? Testing Liberal and
Realist Explanations of Military Transformation Processes**

Mischa Hansel, Justus Liebig University Giessen

Simon Ruhnke, University of Cologne

Paper to be presented at the
8th ECPR General Conference

University of Glasgow

September 3rd – 6th, 2014

A Revolution of Democratic Warfare? Testing Liberal and Realist Explanations of Military Transformation Processes

Mischa Hansel and Simon Ruhnke

1 Introduction

Armament policies are determined by domestic rather than international politics according to liberal IR perspectives. More specifically, military transformation processes in democratic countries are understood as being informed, first and foremost, by the political need to limit the number of casualties during military operations (Schörnig 2007: 34-62). Only by doing so, liberal scholars argue, can decision-makers hope to get enough public support for sustained military engagements. Inasmuch as casualty-shyness guides strategic decision-making in democratic countries, attrition modes of warfare are becoming unacceptable. It is therefore only logical that many democratic countries seem to press ahead with the 'Revolution in Military Affairs (RMA)', a process in which information and automation technologies allegedly substitute for indiscriminate firepower and 'boots on the ground' (see Arquilla and Ronfeldt 1997: 2; Libicki 1996).

Our paper questions this liberal interpretation of democratic armament policies. It evaluates the timing and programmatic choices of armament policies of more than thirty countries, democratic and non-democratic, combining different indicators of information technology procurement and usage by national militaries. The outline of our analysis is as follows: First, we take a closer look at liberal propositions and some supporting evidence. Second, we explain our sampling method and categorization scheme. In our third chapter, we focus on the dependent variable. On the basis of three data sets on cyber-attack capabilities, satellite acquisition and usage, and drone programs respectively, countries are categorized into RMA-leaders, catchers-up, followers, stragglers, entrants and deniers.

The remaining chapters seek to test the explanatory power of two competing independent variables, representing liberal versus realist accounts of military transformation processes. The fourth chapter focusses on country-specific Unified Democracy Scores (UDS). Our analysis reveals that membership in RMA-categories is indeed weakly correlated with regime type. In the fifth chapter, we reconsider our findings in light of data on national gross

domestic product (GDP) as an indicator of relative national resource bases. The latter does indeed more reliably predict RMA rankings than regime type variables. Our conclusion wraps up our results and discusses a number of factors that future research on military transformation processes might include.

2 Democratic Warfare and the ‘Revolution in Military Affairs’ (RMA): Propositions and Evidence

Research on the so-called democratic peace revealed both significant and ambiguous findings (for recent overviews and debates see Dafoe, Oneal and Russett 2013; Ungerer 2012; Hayes 2012). On the one hand, numerous quantitative studies have corroborated the claim that democratic dyads are systematically more peaceful than pairs of autocracies or dyads of mixed regime types. On the other hand, it could not convincingly be demonstrated that democracies are generally more peaceful than nondemocratic states. Thus, some scholars reframed the empirical puzzle as a separate democratic peace (Lipson 2005).

Liberal IR scholars have tried to account for this inconsistency in different ways. Some struggled to prove the influence of third variables that arguably neutralize the peaceful inclinations of democracies under some circumstances. Most often referred to are manipulative political communication efforts and dysfunctional ‘markets of ideas’, covert military operations, the enlistment of private military companies and local allies as proxies, and high-tech weapons permitting low-casualty warfare (see below). Others have focussed on the possibility that the very same characteristics, which cause democratic states to refrain from violence in their dealings with each other, lead them to aggressive postures vis-à-vis non-democratic countries. Out-group /in-group dynamics and the salience of humanitarian ideals appear as double-edged swords in this regard. Both approaches are interested in what has been coined “anomalies” (Müller 2002: 50-52)) or the “dark side of the democratic peace” (Geis, Brock and Müller 2006). Both stick to the more general liberal belief that regime type matters in war planning and war making.

Quite a few of those who stress the influence of third variables point to the casualty-shyness of decision-makers in democratic countries. This resonates equally well with rational-choice and constructivist/sociological versions of democratic peace research (Sauer and Schörnig

2012: 368).¹ In the former, it is the worry of not getting re-elected that dissuades decision-makers from initiating and escalating costly military endeavours. In the latter, casualty-shyness results from deep-seated cultural dispositions towards peaceful conflict-resolution. Decision-makers will try their best to externalize their domestic political culture and, therefore, they will not support large-scale violence except for circumstances where the survival of their country is at stake.

Casualty shyness, however, is never absolute. Nor is the prospect of war-casualties unalterable by strategic and operational decisions. Various options for reducing the risks to soldiers and civilians exist – ranging from private military companies to stand off weaponry and precision-guided munitions (see above). It is these options, and their availability to democratic leaders, which can explain the mixed record of war initiation by democracies according to liberals (see Geis, Müller and Schörnig 2010: 175-176). Wherever democratic leaders face weak authoritarian opponents, deprived of comparable technological capabilities and monetary resources, war appears easily winnable and, therefore, does not come with many electoral risks. It also appears justifiable in terms of human suffering and, therefore, does not necessarily violate accepted codes of ethical behaviour, particularly if the residual violence appears to serve liberal ends such as the protection of civilians from massive human rights atrocities. In short: With the prospect of riskless and/or surgical warfare, democracies' distinct institutions and its ethical dispositions lose much of their pacifying influence.

Here is where the debates about democratic warfare and the revolution in military affairs intersect. While the former attributes a particular demand for casualty-minimizing military options to democracies (Müller 2002: 57), adherents of the RMA-thesis view recent advances in information technologies as being able to deliver exactly such options (see Arquilla and Ronfeldt 1993, 1997; Owens 2001)²: Stealth attack capabilities, autonomously operating combat devices, guided weapons etc. Is it not merely logical for democracies to put

¹ We do not regard rational-choice and sociological frameworks of analysis as being akin to liberalism, institutionalism, realism or other major IR paradigms. Rather they are conceptualized here as meta-theoretical approaches, i.e. conceptual frameworks of a higher order (see Deitelhoff and Zürn 2013). Whereas rational-choice approaches model all social actors as individual utility maximizers that follow a 'logic of consequences', sociological perspectives stress that social actors want to keep their actions consistent with salient collective norms, that is they follow a 'logic of appropriateness' (March and Olson 1989: 160-162). Individual IR theories, perhaps with the exception of structural realism, can incorporate either of the two perspectives.

² A comprehensive treatment of the RMA-debate is beyond the reach of this article. Some excellent reviews, most of them written from a rather critical viewpoint, are provided by Helmig and Schörnig (2008), Benbow (2004), Lonsdale (2004), Møller (2002), and Biddle (1998).

themselves in the driver's seat of the RMA by funnelling their R&D spending accordingly? Would it not make sense for them to reorient weapons acquisition budgets towards IT-enabled military capabilities and postures?

This is not to say that authoritarian countries will refuse to reap the benefits of the RMA or that they feel completely comfortable with lagging behind. Both the competitiveness of the international system and the causal weight of what is known as "technological imperative" is almost undeniable (Buzan and Herring 1998: 50-51). The argument rather is that democracies are more ready to embrace and accelerate the RMA than autocracies are (Müller and Schörnig 2002: 356; Schörnig and Lembcke 2006: 208). It is not by coincidence then, liberal scholars argue, that democratic states are on top of recent military transformations (Müller and Schörnig 2002: 354, 363). IT-enabled military capabilities, such as automated combat drones, are the "silver bullet" of democratic warfare (Sauer and Schörnig 2012: 370; Schörnig and Lembcke 2006: 208). There is a "distinct democratic eagerness to employ" such tools (Sauer and Schörnig 2012: 371) and drones in particular (Franke 2013: 7-9). Concluding it is fair to say then that democratic institutions and norms work as reinforcements or even indirect causes of the RMA (see, for example, Eissing 2006: 16, 22).

We are sceptical towards such reasoning on at least three different grounds: First, it is only partly consistent with the empirical evidence on democratic war initiating. This particularly applies to the rational-choice variant, which fails to explain the absence of war between materially unequal democratic states. Second, there are conceptual issues, which, in our view, are in need of clarification. For instance, how does the claim of regime types having a causal influence on technological development relate to the more general debate on social versus technological determinism? (see Winner 1977, 1986; Smith and Marx 1994). Moreover, why is it the political system, rather than market structures, that drives the RMA? After all, most innovations in the realm of information technology originated in the commercial sector (Benbow 2004: 89-90). Last and most important for our purpose there are only very few empirical studies supporting these claims to this date.

Some supporting evidence is provided by Niklas Schörnig and Alexander C. Lembcke in a study on armament advertisements, demonstrating that a language of casualty aversion is systematically used therein as a major selling point (Schörnig and Lembcke 2006). What they do not prove, however, is that casualty-minimization options matter more for democratic governmental buyers than for authoritarian ones. This is because their sample included only

advertisements by “firms located in wealthy and established western democracies” (Schörnig and Lembcke 2006: 205). As the authors point out themselves, the major customers of these weapons manufactures tend to be either their own national government or the government of other democracies (Schörnig and Lembcke 2006: 211-212). Consequently, the advertisements tell us little about the preferences of defence planners in authoritarian countries.

Frank Sauer and Niklas Schörnig, in another article, point to the fact that among those 34 countries, which, according to the *Military Balance*, dispose of medium or heavy-sized UAVs, 24 “can safely be called democratic” based on their score in the Polity IV democracy index (Sauer and Schörnig 2012: 364). Franke (2013) offers a similar argument. Yet even if democracies are overrepresented in the drones club, the old caveat applies that correlation is not causation. Sauer and Schörnig, of course, acknowledge this. However, they do not seriously consider the influence of third variables, except for economic wealth, which they treat in a rather straw man-like fashion (by saying that no defence budget was limitless and that military transformations did therefore not purely follow technological innovations) (Sauer and Schörnig 2012: 364).

3 Methodological Considerations and Sampling

The following analysis is based on a sample of 33 individual countries. Our selection criteria seek to maximize the variation of possible causal influences (regime type, gross domestic product etc.) while avoiding biases which may simply be the result of data availability issues (more transparent defence policies of NATO members etc.). At the same time, we wanted to make sure that our sample reflects the globalized nature of contemporary international politics. Therefore, we decided to include each country which has been a member of the United Nations Security Council from January 2010 to December 2013. The resultant sample encompasses countries that presumably all share a minimum ambition in world politics but differ in terms of geographical background, defence spending, regime type etc.

Data acquisition and analysis proceeds in two steps. First, we focus on the dependent variable by conceptualizing categories of gradual RMA-achievements: RMA-leaders, catchers-up, followers, stragglers, entrants and deniers. Second, the emphasis will be on two competing explanatory variables, each representing a major IR theory. We did refrain from envisaging a simple numerical RMA-index for two reasons. First, many of the relevant issues do not lend themselves easily to quantitative operationalization. Their measurement in many cases

requires a combination of factors, which relies very much on informed qualitative judgements. Understanding RMA-achievements in a way that combines qualitative concepts and quantitative measurements, we follow the “middle path” of fuzzy-set social science (Ragin 2007: 2).

Second, our categories reflect the observation that what matters in the theoretical debate about the drivers of military transformation processes is not so much the exact ranking of countries but groupings or clusters of them. Neo-realism would predict a clustering according to national resource bases. Regional security competitors, in particular, should find themselves in the same RMA-category, due to ongoing balancing efforts. Liberal IR theory, in contrast, expects predominantly democratic clusters on top of the RMA-Ranking. The reason is regime-type specific benefits (see above) and democracies particular eagerness and ability to cooperate with each other, and thus their need to address interoperability issues in their defence policy.

4 Who is in the Driver’s Seat? On Leaders, Laggards and Those in between

The following RMA-categorization of 33 sample countries results from consideration of military capabilities in three issue areas: drones, satellites and cyber. Whereas traditional military platforms such as planes, tanks or destroyers, need to adapt to new technological realities in order to take part in information-centered networked warfare, these capabilities and their characteristics represent the core of the RMA: Lack of firepower and armor, but heavy reliance on information and huge networking potential. What is more, data on drone usage or satellite purchases is more available and much more standardized than data on informationalization of peculiar military systems.

4.1 Drones

Unmanned aerial vehicles (UAVs), commonly also referred to as drones, play a prominent role in the RMA.³ They significantly improve tactical situation awareness. They reduce the material costs of obtaining such information. They operate without endangering their human

³ Whether or not they are remotely controlled from military bases, part of the interest in their rise from technicians, military thinkers, and scholars alike seems to relate to UAVs’ robot-like nature. UAVs are often perceived of as autonomously flying fighters and thus an embodiment of robot warfare in the skies. Although this is not true for the large majority of military drones currently in operation, it seems to boost the drones’ perceived importance.

operators and they are more enduring than regular aircraft. The CIA drone campaign in Pakistan, Yemen and other places demonstrates the fighting capability of drones as an additional use (Bergen & Tiedemann 2011). In short, UAVs provide excellent assets for the conduct of both conventional warfare and counterinsurgency campaigns. The fusion of remotely controlled reconnaissance and fire power in particular has been hailed as a revolution by RMA theorists, enabling an information-centred kind of warfare in which sensor-to-shooter gaps are almost non-existent and in which being seen equals being hit on the battlefield (Libicki 1996: 263).

Acquiring data about the development and use of UAVs is a burdensome task. Reliable data sources are at premium. States differ in the degree of secrecy they apply to their military drones. In unveiling the level of UAV-usage of our sample of states we made use of a few different sources⁴. The best and most encompassing data were retrieved from the annual issues of the Military Balance and the SIPRI Arms Transfers Database (Military Balance, SIPRI). We also consulted a list drawn up by *The Guardian* (2012), armed forces or parliamentary documents available online, webpages of drone producing companies (i.e. Cassidian, Elbit Systems, Insitu, Israeli Aerospace Industries), and regional journals and think tanks (i.e. Americas Society/Council of the Americas, Asian Military Review, Eurasia Review) as well as *Jane's International Defence Review*. It is possible that the data we gathered are incomplete, for some states even manipulated. However, we believe that they are sound enough for our research purpose, which is to label UAV users as RMA-leaders, catchers-up, followers, stragglers, entrants and deniers

Based on such publically available material we considered five different indicators:

- total number of tactical and strategic UAVs (excluding mini-UAV for which data were not consistent enough)
- date of first UAV procurement
- maximum range of long range/strategic UAVs with a minimum range of 200km
- maximum range of tactical UAVs with less than 200km range
- Maximum payload of UAV (to indicate the likeliness of existent combat drones UCAVs)

⁴ We would like to express our gratitude to Ulrike Esther Franke, who help us a great deal in understanding the empirical puzzle and provided parts of her database.

Consistent with our overall qualitative-quantitative approach we located the sample states into quintile groups. For our second indicator “first procurement” we gave a 1 for states that procured UAVs before 1990 and divided the time up until 2010 into 5-year-periods. So states could score 0.8 if they procured until 1995, 0.6 before 2000; 0.4 before 2005, 0.2 before 2010 and were assigned a 0 if they have not yet procured UAVs or did so after 2010. For the two range indicators “long range” and “small range” as well as for the indicator “payload” we assigned the 0.2-stepped scores according to descending order among the 33 sample states. For our first indicator “number of UAVs” we assigned scores as derivatives of the sample state with the highest number of UAVs (the US). In doing so, the maximum number of drones “MaxUAV” in the sample was set as 1.0 and every fifth of “MaxUAV” is defined as one quintile. So to score a 1.0, a country needed to have at least 80% (or 4/5) of the maximum number of drones in the sample, to score 0.8 at least 60% (or 3/5) and so on.

To come to the final score regarding the drone variable we calculated each indicator score, divided by the result by five, and rounded the results towards the next highest quintile score. This table emerged as the result:

Table 1: Procurement of Drones

Country	UAV	Label
United States	1	RMA-Leader
France	0,8	Catcher-Up
Turkey	0,8	Catcher-Up
United Kingdom	0,8	Catcher-Up
PR China	0,8	Catcher-Up
Germany	0,8	Catcher-Up
India	0,8	Catcher-Up
Russian Federation	0,6	Follower
Australia	0,6	Follower
South Africa	0,6	Follower
Columbia	0,6	Follower
Brazil	0,6	Follower
Chile	0,6	Follower
South Korea	0,6	Follower
Azerbaijan	0,6	Follower
Mexico	0,6	Follower
Morocco	0,6	Follower
Pakistan	0,4	Straggler
Lebanon	0,4	Straggler
Nigeria	0,4	Straggler
Argentina	0,4	Straggler
Japan	0,4	Straggler
Portugal	0,4	Straggler
Uganda	0,2	Entrant
Austria	0,2	Entrant
Bosnia and Herzegovina	0	Denier
Chad	0	Denier
Gabon	0	Denier
Guatemala	0	Denier
Lithuania	0	Denier
Luxemburg	0	Denier
Rwanda	0	Denier
Togo	0	Denier

4.2 Space Capabilities

Space assets such as surveillance, navigation or communication satellite systems serve as the backbone of the RMA (Müller and Schörnig 2002: 372) and they are necessary for achieving

and sustaining information superiority in wartime (Handberg 2000: 87-118; Mowthorpe 2004: 165-184; Hays 2009). Some data on the increasing use of space assets during US military campaigns in the 1990s and 2000 is illustrative in this regard. For instance, the percentage of guided munitions (via lasers or GPS signals) grew from just eight per cent in the 1991 Gulf War to 34 per cent in the 1999 Kosovo air campaign and 59 per cent during Operation Enduring Freedom (OEF) in Afghanistan 2001/02. By the time Operation Iraqi Freedom (OIF) took place, that figure had risen to 68 per cent (Dolman/Hays/Mueller 2006: 3). Already in 1991, the majority of intra-theatre and inter-theatre communications (85 per cent) were transmitted by satellites. That being said, 500,000 US soldiers in 1991 had seven times less bandwidth at their disposal than 50,000 in Afghanistan 2001 (Lambeth 1999: 74). By exploiting those space-based systems and services conventional military power could be used more decisively, selectively, and efficiently than ever before. Precision warfare superseded attrition. Most notably, the risks of soldiers were minimized, at least in conventional battle (Shaw 2005: 10).

A nation's investment in space capabilities may thus be one of the most credible indicators of its attitude vis-à-vis the RMA. What complicates these matters, however, is the dual-use character of space technology. The very same space assets, according to this logic, can be used for both civil, commercial and military purposes. Knowing which space assets are dedicated to military end users does therefore not reveal the full spectrum of military ambitions. Considering all space assets with even the slightest military value would be an even less reliable method of inference however. Weighting the pros and cons, we therefore settled on the first way of categorizing military space capacities.

Our data acquisition in this chapter rests on comprehensive and publicly available satellite database of the Union of Concerned Scientists (UCS). This database lists all known operational satellites, provides technical parameters and details about builders, launchers, owners and operators. The last category is further divided into governmental, civil, commercial, scientific and military end users. Only the latter was included in our analysis for reasons we mentioned above. Another methodological issue, no less important, relates to the timing of satellite launches and projects. Although the database provides launching dates, it is inadequate for sequential analysis because decommissioned satellites are not listed. The database, in other words, represents a single data point, September 1st 2013 in our case (the day of the last update). Yet there simply is no accessible, reliable and comprehensive

alternative. Therefore we decided to make use of the UCS database despite this one major disadvantage.

Our analysis differentiated two aspects: Numbers and satellite applications. First, we took into account absolute and relative numbers of satellites operated by a sample country's military. On that basis, we grouped our sample countries in the following way: Those having more than one hundred operational military satellites (only the US) were assigned a full point, those having at least fifty (Russia) were credited with 0,8, those having ten or more (France and China) received 0,6, those having at least five (India, Germany and the UK) were assigned 0,4, those having at least a single satellite (Turkey, Mexico, Pakistan, South Korea, Australia, Chile) each went with 0,2, the rest got zero points.

Second, we included a qualitative criterion by focussing on various satellite applications. The more comprehensive the portfolio of a military's space capabilities, we argue, the more accurate it is to view the respective country as a leader of the RMA. Five categories were separately coded: Communications, navigational and location services, surveillance and reconnaissance, electronic and signal intelligence (ELINT & SIGINT), and technological development projects. Only the US military appeared to dispose of all five applications. It was credited with a full point accordingly. While Russia, France and China (each getting a 0,8) covered four applications respectively, none of our other sample countries reached the threshold of three different satellite applications. Germany and India were credited with 0,2 points each for their two applications while the UK, Chile, Australia, South Korea, Pakistan, Mexico and Turkey each received the minimum of 0,2.

Finally, we computed an average value made of both indicators for every sample country and rounded the results towards the next highest quintile score. This resulted in the following ranking:

Table 2: Military Satellite Use

Country	Space	Label
United States	1	RMA-Leader
France	0,8	Catcher-Up
PR China	0,8	Catcher-Up
Russian Federation	0,8	Catcher-Up
United Kingdom	0,4	Straggler
Germany	0,4	Straggler
India	0,4	Straggler
Turkey	0,2	Entrant
Australia	0,2	Entrant
Chile	0,2	Entrant
South Korea	0,2	Entrant
Mexico	0,2	Entrant
Pakistan	0,2	Entrant
South Africa	0	Denier
Columbia	0	Denier
Brazil	0	Denier
Azerbaijan	0	Denier
Morocco	0	Denier
Lebanon	0	Denier
Nigeria	0	Denier
Argentina	0	Denier
Japan	0	Denier
Portugal	0	Denier
Uganda	0	Denier
Austria	0	Denier
Bosnia and Herzegovina	0	Denier
Chad	0	Denier
Gabon	0	Denier
Guatemala	0	Denier
Lithuania	0	Denier
Luxemburg	0	Denier
Rwanda	0	Denier
Togo	0	Denier

4.3 Cyber Attack Capabilities

Cyber-attack capabilities, many say, will revolutionize the mode of warfare at some point in the future, probably more than any other single operational capacity. Attrition via physical destruction may become completely dispensable as future enemies no longer need to be physically disarmed. Instead, one could paralyze them through computer-based sabotage acts

against their command and control systems and/or against other vital infrastructures (see Schwartau 1994; Molander, Riddile and Wilson 1996). The 2011 malware attacks against Iranian uranium-enrichment plants are a case in point (see Albright, Brannan and Walrond 2011).

We do not argue that expectations of completely virtual warfare will ever become true. To the contrary, we concur with many sceptical strategists who doubt that cyberwar will ever be able to disentangle warfare from physical violence (see, for example, Lawson 2011 and Lonsdale 2004). That being said, such hopes resonate well with the preferences of democratic decision-makers according to liberal scholars. From this follows that democracies should be systematically more inclined toward the acquisition of military cyber-attack capacities than other regime types.

As with the other technological issues, our aim was to infer a ranking of the military prowess of our sample countries. The challenges of data availability and interpretation were immense in this case, even more so than in the other cases. First, dual-use issues and resultant ambiguities are extraordinary (see Owens, Dam and Lin 2009: 315-317 and Hansel forthcoming). Cyber-attack capabilities, whether they relate to technological knowledge or organizational capacities, are able to serve many different purposes, ranging from crime to industrial espionage to censorship and domestic surveillance tasks. We therefore had to be very careful in choosing indicators that primarily support the assumption of military intentions as driving factors of attack capabilities. Second, R&D programs, military doctrines, war games, and organizational competencies have all been very selectively disclosed by only some countries, and there are few, if any, opportunities to check for the adequateness of this information. Our data acquisition therefore heavily relies on expert judgements and a few authoritative studies on the subject.

All in all our categorization depends on five indicators. Our first and second indicators are based on a study conducted by James A. Lewis and Katrina Timlin on behalf of UNIDIR (Lewis and Timlin 2011). Amongst other things, the study lists all countries about which information on military cyber doctrines and dedicated military organizations is publicly available. Each of our sample countries that appeared in this list was credited with one-fifth (0,2) points, the other were recorded with zero. Moreover, each country, for which there was evidence of offensive capabilities and/or intentions received an additional one-fifth point.

Third, we consulted a survey commissioned by MacAfee among senior operatives of critical

infrastructures (Baker, Waterman and Ivanov 2011). The study is highly relevant for our purpose because, amongst other things, respondents were asked to name one state, which, in their view, represents the biggest threat to their country/industrial sector (Baker, Waterman and Ivanov 2011: 30-31). All in all, six countries were named: The US and China leading with wide margins (36 and 33 percent respectively), followed by Russia (12 percent) as well as France, the UK and Germany (each less than ten percent). Despite these differences, we decided to assign one-fifth point to each one of the six countries which also appear in our sample. This is because of the particular way in which the survey question was posed. Although it matters, of course, by how many experts a country is coined the single most dangerous threat, what matters more, in our view, is the fact that all of these countries were considered by at least some experts as being the world leader of cyber-attack capabilities.

Our fourth and fifth indicator, hopefully, represent the views of the scientific community on the issue of cyber warfare. One is based on the Information Warfare Monitor Project, a multinational and interdisciplinary research endeavour, which lasted from 2002 until January 2012. The content is still available at the official homepage.⁵ Every sample country which had been tagged there has been assigned an additional fifth-one point. Finally, we searched Reuter's social science citation index⁶ for items, whose content was associated with the prefix 'cyber', 'military' and our countries names respectively. All sample country names, which, in combination with the other terms, generated a minimum of at least three matches, were listed and they received another fifth-one point accordingly.

Adding up the results provided by each of the five indicators, our overall ranking in respect of cyber warfare capabilities is as follows:

⁵ <http://www.infowar-monitor.net/>

⁶ <http://thomsonreuters.com/social-sciences-citation-index/>

Table 3: Cyber Attack Capacities

Country	Cyber	Label
United States	1	RMA-Leader
PR China	1	RMA-Leader
Germany	0,8	Catcher-Up
Russian Federation	0,8	Catcher-Up
South Korea	0,8	Catcher-Up
France	0,6	Follower
United Kingdom	0,6	Follower
India	0,4	Straggler
Argentina	0,4	Straggler
Turkey	0,2	Entrant
Australia	0,2	Entrant
Columbia	0,2	Entrant
Brazil	0,2	Entrant
Pakistan	0,2	Entrant
Japan	0,2	Entrant
Austria	0,2	Entrant
South Africa	0	Denier
Chile	0	Denier
Azerbaijan	0	Denier
Mexico	0	Denier
Morocco	0	Denier
Lebanon	0	Denier
Nigeria	0	Denier
Portugal	0	Denier
Uganda	0	Denier
Bosnia and Herzegovina	0	Denier
Chad	0	Denier
Gabon	0	Denier
Guatemala	0	Denier
Lithuania	0	Denier
Luxemburg	0	Denier
Rwanda	0	Denier
Togo	0	Denier

4.4 Overall categorization

Having identified the score of the sample countries for each of our three dependent variables it remains to be seen, how the countries score overall. Based on our assessment this picture of the Revolution in Military Affairs emerges:

Table 4: Overall Categorization

Country	Total	Label
United States	1	RMA-Leader
PR China	1	RMA-Leader
France	0,8	Catcher-Up
Germany	0,8	Catcher-Up
Russian Federation	0,8	Catcher-Up
United Kingdom	0,6	Follower
India	0,6	Follower
South Korea	0,6	Follower
Turkey	0,4	Straggler
Australia	0,4	Straggler
Columbia	0,4	Straggler
Brazil	0,4	Straggler
Chile	0,4	Straggler
Mexico	0,4	Straggler
Pakistan	0,4	Straggler
Argentina	0,4	Straggler
South Africa	0,2	Entrant
Azerbaijan	0,2	Entrant
Morocco	0,2	Entrant
Lebanon	0,2	Entrant
Nigeria	0,2	Entrant
Japan	0,2	Entrant
Portugal	0,2	Entrant
Uganda	0,2	Entrant
Austria	0,2	Entrant
Bosnia and Herzegovina	0	Denier
Chad	0	Denier
Gabon	0	Denier
Guatemala	0	Denier
Lithuania	0	Denier
Luxemburg	0	Denier
Rwanda	0	Denier
Togo	0	Denier

The results are interesting and somewhat surprising. No surprise is of course the fact that the lone super-power and its contender score the highest. Quite unexpected is the score for the United Kingdom, because it seems to be a catcher-up or a follower. One would have probably expected the country to score in between the first two categories rather than labels two and three. In a general perspective, it is interesting to note that stragglers, entrants, and deniers

form a much larger group than those leading the pack. Deniers actually form the second largest group, with entrants being the largest. The overall number of states in the three lowest categories is more than two and a half times higher than of those in the highest three groups (24 to 9). We have just as many entrants (9) as countries in the upper half of the categories (RMA-Leaders, catchers-up, and followers). This can be interpreted in two ways. One could argue that the RMA is not as big or intensive as suggest. Or one could take the position that it still continues to accelerate, given the fact that entrants are most prominent in our sample.

5 RMA and Regime-Type

In this chapter we aim to test the liberal assumption of correlations between RMA-leadership and regime type. Recall that the democratic war thesis encompasses both rational and sociological arguments (see above). Methodologically this requires us to rely on measurements of democracy that are able to simultaneously capture institutional incentives and constraints as well as democratic values and norms. Consequently, a number of widely used but rather unidirectional democracy indices measuring institutional constraints only proved inadequate. For example, neither the Vanhanen index nor the Polity IV index takes into account democratic norms such as civil rights and liberties (see Munck and Verkuilen 2002). Freedom House, another well-known democracy index, considers institutions and civil and political rights as equally relevant, but faces significant reliability and validity problems (Schmidt 2010: 385-386; Müller and Pickel 2007: 532-533). Instead of relying on any individual democracy index, we chose to base our analysis on the more recently developed Unified Democracy Scores (UDS) (Pemstein, Meserve and Melton 2010). The UDS approach is cumulative by synthesizing a new measure of democracy from 10 extant scales, “building on a model of the democracy rating process” (Pemstein, Meserve and Melton 2010: 427). It does not

simply improve measurement confidence but also minimize the impact of idiosyncratic errors that occur in individual measures and take advantage of the level of agreement between raters to perform a form of intercoder validation across major democracy scales” (Pemstein, Meserve and Melton 2010: 427).

Equally important for the purpose of our study, the UDS represent the single most comprehensive approach to democracy measurement, combining indices with a focus on institutional constraints (Vanhanen, Polity, PACL, Arat) with those putting special emphasis on democratic values and political liberties (Polyarchy, Freedom House) and with mixed

indices (BLM, Bollen, Hadenius, PRC).

Finally, another advantage of UDS is the covered time-period. UDS are available for almost every country from 1946 to 2012. Since it is often said that the RMA proved its full potential during and after the 1991 Gulf War, we limited the regime-type measurement to the years 1990-2010. We calculated a UDS score mean for each sample country. The following table presents national UDS score means alongside our RMA-Categories:

Table 5: RMA-Categories and UDS Scores

Country	Total	Label	UDS Score Mean 1990-2010
United States	1	RMA-Leader	1,63899698
PR China	1	RMA-Leader	-1,05779418
France	0,8	Catcher-Up	1,10031789
Germany	0,8	Catcher-Up	1,51126565
Russian Federation	0,8	Catcher-Up	0,02337585
United Kingdom	0,6	Follower	1,32371451
India	0,6	Follower	0,68709972
South Korea	0,6	Follower	0,80344118
Turkey	0,4	Straggler	0,38629170
Australia	0,4	Straggler	1,82735114
Columbia	0,4	Straggler	0,23883933
Brazil	0,4	Straggler	0,73483067
Chile	0,4	Straggler	0,80005716
Mexico	0,4	Straggler	0,40823493
Pakistan	0,4	Straggler	-0,11109205
Argentina	0,4	Straggler	0,76508436
South Africa	0,2	Entrant	0,40760609
Azerbaijan	0,2	Entrant	-0,54642094
Morocco	0,2	Entrant	-0,56564685
Lebanon	0,2	Entrant	-0,03643052
Nigeria	0,2	Entrant	-0,27838629
Japan	0,2	Entrant	1,18983519
Portugal	0,2	Entrant	1,35106915
Uganda	0,2	Entrant	-0,35801408
Austria	0,2	Entrant	1,86565346
Bosnia and Herzegovina	0	Denier	0,00143955
Chad	0	Denier	-0,50021223
Gabon	0	Denier	-0,29505119
Guatemala	0	Denier	0,23797034
Lithuania	0	Denier	1,07753651
Luxemburg	0	Denier	1,49695118

Rwanda	0	Denier	-0,68366491
Togo	0	Denier	-0,39244258

There are several points worth mentioning in this regard. First, all categories display a mix of regime types. Hence, democratic incentives and constraints represent very unlikely the most important predictors of RMA development. Second, some of those with outspokenly positive UDS scores hardly show any eagerness to join the RMA at all. This particularly applies to Austria, but also Luxemburg. Australia with high UDS scores but only modest RMA-capabilities is another case that does not fit the pattern predicted by theories of democratic wars. Moreover, China represents an aberration, joining the United States as RMA-leader despite having by far the most negative UDS-score of all sample countries.

On the other hand, there still is some correlation between RMA-ranking and regime type, considering the overall pattern. Countries with positive UDS score tend to inhabit the higher RMA-ranks while countries with lower UDS score find themselves more often in the entrant or denier category. This overall pattern becomes more visible if we calculate the average UDS score mean of each of our RMA categories as in table 6:

Table 6: UDS-Scores per Group⁷

RMA-Categories	Average UDS-Scores
RMA-Leader	0,29060140
Catcher-Up	0,98966848
Follower	0,62561087
Straggler	0,66618651
Entrant	0,33658502
Denier	0,11781583

Liberal assumptions about military transformation processes seem corroborated by the fact that catcher-up on average show higher UDS scores than do followers, stragglers score higher than entrants, which, in turn, are significantly more democratic than are deniers. The mixed dyad ranking on top is an anomaly however, as is the modest UDS scoring of the follower category as compared to the straggler group. Generally speaking, the span of mean values is not very big (0,7 points) given that the UDS scale allows for variations that are much larger

⁷ UK is categorized as Catcher-Up, Turkey is categorized as Follower in this calculation.

and the span between the most and least democratic countries of our sample is 2,8 (China; Austria).

6 RMA and Resources

As stated at the beginning, realist explanations of national defence policies differ from liberal theories by focussing on system-level rather than unit-level factors (see Buzan and Herring 1998: 83-100; Müller and Schörnig 2006: 60-63). Under the condition of international anarchy, this reasoning goes, states constantly power-balance against each other either by improving their military capabilities or by forming or enlarging alliances (Waltz 1979: 102-128). While the latter strategy creates fears of abandonment and can therefore not reliably guarantee a nations security, the first is dependent on sufficient national resources, which are, of course, ultimately economic ones. Unilaterally usable military power, thus, is a function of relative national wealth. Information-centred military capabilities are no different in this regard.

The more they promise to increase military efficiency and effectiveness, the higher system-induced pressures to adjust defence spending and military procurement policies accordingly. Military innovations have always diffused throughout the international system in this way:

Competition produces a tendency toward the sameness of the competitors [...] Contending states imitate the military innovations contrived by the country of greatest capability and ingenuity. And so the weapons of major contenders, and even their strategies, begin to look much the same all over the world (Waltz 1979: 127).

States, as defensive positionalists (Grieco 1990: 44-45; Waltz 1986: 334), will seek to not fall too far behind in the process of the RMA. Consequently, they devote a maximum of available resources to the transformation of their military forces. Otherwise, they would suffer from declining military prowess and, eventually, find themselves surrounded by better-equipped political rivals.

Realist explanations of the RMA capability-gaps (see above) tend to be straightforward. Rather than being the result of regime-type specific incentives, this rank order emerges out of a large variance of national wealth. Rich nations appear on top of the RMA, poor nations will lack behind or they will be unable to compete at all. In order to test this alternative realist explanation of the RMA the following table juxtaposes RMA-Categories and mean gross domestic product (GDP) (in current US Dollars) from 1990-2010 for each of our sample

countries:

Table 7: RMA-Categories and GDP Mean 1990-2010

Country	Total	Label	GDP in USD Mean 1990-2010
United States	1	RMA-Leader	10.343.919.047.619
PR China	1	RMA-Leader	1.860.968.588.322
France	0,8	Catcher-Up	1.760.704.854.710
Germany	0,8	Catcher-Up	2.443.432.942.471
Russian Federation	0,8	Catcher-Up	644.671.113.024
United Kingdom	0,6	Follower	1.696.192.942.974
India	0,6	Follower	650.834.468.993
South Korea	0,6	Follower	609.215.009.385
Turkey	0,4	Straggler	352.893.130.475
Australia	0,4	Straggler	577.242.747.584
Columbia	0,4	Straggler	128.950.447.510
Brazil	0,4	Straggler	842.729.645.895
Chile	0,4	Straggler	96.986.884.220
Mexico	0,4	Straggler	669.899.396.536
Pakistan	0,4	Straggler	95.528.246.516
Argentina	0,4	Straggler	241.225.100.123
South Africa	0,2	Entrant	181.163.941.103
Azerbaijan	0,2	Entrant	13.897.454.416
Morocco	0,2	Entrant	49.684.811.745
Lebanon	0,2	Entrant	17.490.195.516
Nigeria	0,2	Entrant	79.351.283.126
Japan	0,2	Entrant	4.426.928.063.592
Portugal	0,2	Entrant	1.487.738.965.553
Uganda	0,2	Entrant	8.182.097.185
Austria	0,2	Entrant	254.458.727.647
Bosnia and Herzegovina	0	Denier	8.124.027.818
Chad	0	Denier	3.412.212.571
Gabon	0	Denier	8.007.166.848
Guatemala	0	Denier	20.723.076.694
Lithuania	0	Denier	18.370.310.053
Luxemburg	0	Denier	28.066.139.223
Rwanda	0	Denier	2.491.219.478
Togo	0	Denier	1.888.701.792

Data Source: United Nations Statistic Division, <http://unstats.un.org/unsd/snaama/dnllist.asp> (accessed: July 13,

2014).

With few exceptions, GDP decreases with lower RMA-ranking and increases the more we approach top-level-positions. The fact that there is indeed a correlation between RMA-ranking and GDP becomes even more obvious if we calculate the GDP mean for each of our RMA-groups:

Table 8: RMA-Categories and GDP Mean per Group 1990-2010⁸

RMA-Category	GDP Mean 1990-2010
RMA-Leader	6.102.443.817.971
Catcher-Up	1.636.250.463.295
Follower	537.647.536.284
Straggler	378.937.495.483
Entrant	724.321.726.654
Denier	11.385.356.810

Data Source: United Nations Statistic Division, <http://unstats.un.org/unsd/snaama/dnllist.asp> (accessed: July 13, 2014).

The most important conclusion we can draw from this is that GDP is somewhat better able to predict RMA-rankings than regime-type. RMA-Leaders and Catcher-Up, for instance, accumulate way more wealth than all other sample countries combined. Further weakening a liberal explanation are those few sample countries that escape the above-mentioned pattern of GDP declining with a lowering of RMA-rankings. Russia, a country that clearly punches above its weight (in terms of relative economic resources) would hardly pass as democracy while Japan, Portugal and Austria, all consolidated democracies, spend much less on RMA-capabilities than they could afford in light of their national economic power. These findings clearly contradict liberal predictions.

This is not to say that they are not puzzling from a realist perspective too. Japan is in fact the main reason why entrants have a much higher GDP mean than stragglers in table 8. This aberration, just like the cases of Portugal, Austria and Russia, remain unexplained by a capability-based realist account of the RMA as long as we do not incorporate additional assumptions such as security commitments, military doctrines and/or regional conflict

⁸ UK is categorized as Catcher-Up, Turkey is categorized as Follower in this calculation.

proneness. Austria, for instance, subscribes to the national security principle of neutrality while Japan still considers itself a civil power, limiting military power to the purpose of territorial self-defence only. Adding such additional variables is, however, beyond the purpose of this article. We will talk about such options in the following conclusion where we want to point out future avenues for research.

7 Conclusion

The main conclusion to be drawn from the above analysis is that our initial questioning of the liberal explanation for RMA-developments proves justified. While we observe some form of connection between democracy-levels and RMA-extent on our sample, the results do not imply clear correlations. In fact, the results for GDP-RMA relations are more straight forward. However, with variables one faces the problem, that when calculating group means, lower groups rank higher/richer than directly neighboring groups (stragglers for UDS; entrants for GDP). Taken together with the depicted aberrations, that meaningful deductions are difficult to infer.

This result is unsatisfying however, because we fall short of an explanation of RMA patterns with the two selected variables. Whether this means that the two theories that informed our indicator choice fail to explain the RMA puzzle should be the content of future research. We think a number of indicators might teach us more about the causes of RMA-trends, i.e. technological prowess, defence commitments, civil-military relationships, enduring international rivalries, or alliance membership, By looking at defence commitments and alliance memberships for instance we might be able to learn more about the way in which the political organization of defence plays into decisions to participate in the RMA. In a similar fashion it might be interesting to look into the role of civil-military relationships. Finally, consider it worthwhile to find out whether the existence of enduring international rivalries has an effect on RMA.

Given the current state of research we do not expect any single variable as the explaining factor of our puzzle. Rather, our guess is that certain combinations of factors make decisions for partaking in the RMA more or less likely.

References

Albright, David/ Brannan, Paul/ Walrond, Christina (2011): *Stuxnet Malware and Natanz: Update of ISIS December 22, 2010 Report*, 15.02.2011, Washington DC: Institute for Science and International Security, http://www.isis-online.org/uploads/isis-reports/documents/stuxnet_update_15Feb2011.pdf (12.03.2014).

Arquilla, John/Ronfeldt, David (1997): „A New Epoch – and Spectrum – of Conflict“, in: John Arquilla/David Ronfeldt (eds.): *In Athena's Camp: Preparing for Conflict in the Information Age*, Santa Monica, CA: RAND, 1-20. Arquilla, John/Ronfeldt, David (1993): „Cyberwar is Coming!“, *Comparative Strategy* 12 (2), 141-165.

Baker, Stewart/Waterman, Shaun and Ivanov, George (2011): *In the Crossfire: Critical Infrastructure in the Age of Cyber War*, Santa Clara, CA: MacAfee.

Benbow, Tim (2004): *The Magic Bullet? Understanding the 'Revolution in Military Affairs'*, London: Brassey's.

Bergen, Peter/Tiedemann, Katherine (2011). „Washington's Phantom War.“ *Foreign Affairs*, Vol. 90, Issue 4, p 12.

Biddle, Stephen (1998): „The Past as Prologue: Assessing Theories of Future Warfare“, *Security Studies* 8 (1), 1-74.

Buzan, Barry/Herring, Eric (1998): *The Arms Dynamic in World Politics*, Boulder/London: Lynne Rienner.

Dafoe, Allan / Oneal, John R. and Russett, Bruce (2013): “The Democratic Peace: Weighing the Evidence and Cautious Inference”, *International Studies Quarterly* 57, 201-214.

Deitelhoff, Nicole/Zürn, Michael (2013): “Die Internationalen Beziehungen: Ein einführender Überblick”, in: Manfred G. Schmidt (ed.): *Studienbuch Politikwissenschaft*, Wiesbaden: VS Verlag, 381-410.

Dolman, Everett C./ Hays, Peter and Karl P. Mueller (2006): *Toward a U.S. Grand Strategy in Space*, Washington, DC: The George C. Marshall Institute.

Eissing, Thomas (2006): *Die Revolution in Military Affairs und ihre Auswirkungen auf die Bereitschaft westlicher Demokratien zum Streitkräfteeinsatz*, Universität der Bundeswehr: Hamburg.

Franke, Ulrike Esther (2013)“ *Just the new hot thing? The diffusion of UAV technology*

worldwide and its popularity among democratic states, Paper presented at the 2013 ISA Annual Convention in San Francisco, Retrieved 2014-02-20 from:
https://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&ved=0CCwQFjAA&url=http%3A%2F%2Ffiles.isanet.org%2FConferenceArchive%2F4269932e782d47248d5269ad381ca6c7.pdf&ei=99IFU6GxKbGZ0AXRv4H4Bw&usg=AFQjCNG6FPeVFO1Imt8UJOIUpE11R2Diqg&sig2=8k5OVxnQqKtQQEDHcZv_ZA&bvm=bv.61725948,d.d2k

Geis, Anna / Müller, Harald and Schörnig, Niklas (2010): „Liberale Demokratien und Krieg: Warum manche kämpfen und andere nicht – Ergebnisse einer vergleichenden Inhaltsanalysen von Parlamentsdebatten“, *Zeitschrift für Internationale Beziehungen* 17 (2), 171-202.

Geis, Anna / Brock, Lothar and Müller, Harald (eds) (2006): *Democratic Wars: Looking at the Dark Side of the Democratic Peace*, Houndmills: Palgrave Macmillan.

Grieco, Joseph (1990): *Cooperation among Nations: Europe, America, and non-tariff Barriers to Trade*, Ithaca: Cornell University Press.

Guardian, The (2012): Guardian Datablog, “Drones by country: who has all the UAVs?” Retrieved 2014-01-15 from:
<http://www.guardian.co.uk/news/datablog/2012/aug/03/drone-stocks-by-country>.

Handberg, Roger (2000): *Seeking New World Vistas. The Militarization of Space*, Westport, CT: Praeger.

Hansel, Mischa (forthcoming): “Cyber Conflict and Psychological IR Perspectives. Explaining Misattributions and Misunderstandings”.

Hayes, Jarrod (2012): “The Democratic Peace and the New Evolution of an Old Idea”, *European Journal of International Relations* 18 (4), 767-791.

Hays, Peter (2009): “Space and the Military”, in: Damon Coletta and Frances T. Pilch (eds.): *Space and Defence Policy*, New York: Routledge, 105-201.

Helmig, Jan and Schörnig, Niklas (eds) (2008): *Die Transformation der Streitkräfte im 21. Jahrhundert: Militärische und politische Dimensionen der aktuellen ‚Revolution in Military Affairs‘*, Frankfurt a. M.: Campus.

Lambeth, Benjamin (1999): „Air Power, Space Power, and Geography“, in: Colin S. Gray (ed.): *Geopolitics, Geography and Strategy*, London: Frank Cass, 63-82.

Lawson, Sean (2011): *Beyond Cyber-Doom. Cyberattack Scenarios and the Evidence of*

History, Fairfax, VA: George Mason University, http://mercatus.org/sites/default/files/publication/beyond-cyber-doom-cyber-attack-scenarios-evidence-history_1.pdf (12.04.2014).

Lewis, James A. and Timlin, Katrina (2011): *Cybersecurity and Cyberwarfare: Preliminary Assessment of National Doctrine and Organization*, Washington, DC: Center for Strategic and International Studies.

Libicki, Martin C. (1996): „The Emerging Primacy of Information“, *Orbis* 40 (2), 261-274. Lonsdale, David J. (2004): *The Nature of War in the Information Age: Clausewitzian Future*, London et al.: Frank Cass.

Lipson, Charles (2005): *Reliable Partners: How Democracies Have Made a Separate Peace*, Princeton: Princeton University Press.

March, James G. and Olsen, Johan P. (1989): *Rediscovering Institutions: The Organizational Basis of Politics*, New York: The Free Press.

Military Balance (2014): *The Military Balance*. An IISS (International Institute for Strategic Studies) publication. Taylor and Francis Online. Accessed 2014-01-10 at: <http://www.tandfonline.com/loi/tmib20#.UyHLJPI5OIV>

Molander, Roger C./ Riddile, Andrew S. and Wilson, Peter A. (1996): *Strategic Information Warfare: A New Face of War*, Santa Monica, CA: RAND.

Mowthorpe, Matthew (2004): *The Militarization and Weaponization of Space*, Lanham, MI: Lexington Books.

Müller, Harald (2002): „Antinomien des demokratischen Friedens“, *Politische Vierteljahresschrift* 43 (1), 46-81.

Müller, Harald and Schörnig, Niklas (2006): *Rüstungsdynamik und Rüstungskontrolle*, Baden-Baden: Nomos.

Müller, Harald and Schörnig, Niklas (2002): „Mit Kant in den Krieg? Das problematische Spannungsverhältnis zwischen Demokratie und der Revolution in Military Affairs“, *Die Friedenswarte* 77 (4), 353-375.

Müller, Thomas and Pickel, Susanne (2007): „Wie lässt sich Demokratie am besten messen? Zur Konzeptqualität von Demokratie-Indizes“, *Politische Vierteljahresschrift* 48 (3), 511-539.

Munck, Gerardo L. and Verkuilen, Jay (2002): "Conceptualizing and Measuring Democracy: Evaluating Alternative Indices", *Comparative Political Studies* 35 (1), 5-34.

Møller, Bjørn (2002): *The Revolution in Military Affairs: Myth or Reality*, Kopenhagen: Copenhagen Peace Research Institute.

Owens, William A./Dam, Kenneth W./ Lin, Herbert S. (2009): *Technology, Policy, Law, and Ethics Regarding U.S. Acquisition and Use of Cyberattack Capabilities*, Washington, DC: The National Academies Press.

Owens, William A. (2001): *Lifting the Fog of War*, Baltimore, MD: Johns Hopkins University Press.

Pemstein, Daniel/Meserve, Stephen A. and Melton, James (2010): „Democratic Compromise: A Latent Variable Analysis of Ten Measures of Regime Type”, *Political Analysis* 18 (4), 426-449.

Ragin, Charles C. (2007): *Redesigning Social Inquiry: Fuzzy Sets and Beyond*, Chicago and London: University of Chicago Press.

Sauer, Frank and Schörnig, Niklas (2012): „Killer Drones: The ‚Silver Bullet‘ of Democratic Warfare?“, *Security Dialogue* 43 (4), 363-380.

Schmidt, Manfred G. (2010): *Demokratietheorien: Eine Einführung*, 5. Auflage, Wiesbaden: VS Verlag.

Schörnig, Niklas (2007): *Theoretisch gut gerüstet? Die amerikanische Rüstungsindustriepolitik der 1990er Jahre aus IB-Perspektive*, Baden-Baden: Nomos.

Schörnig, Niklas and Lembcke, Alexander C. (2006): „The Vision of War without Casualties: On the Use of Casualty Aversion in Armament Advertisements“, *Journal of Conflict Resolution* 50 (2), 204-227.

Schwartz, Winn (1994): *Information Warfare: Chaos on the Electronic Superhighway*, New York, NY: Thunder's Mouth Press.

Shaw, Martin (2005): *The New Western Way of War. Risk-Transfer War and its Crisis in Iraq*, Cambridge: Polity Press.

SIPRI (2014): *SIPRI Arms Transfers Database*. Accessed 2014-01-10 at: <http://portal.sipri.org/publications/pages/transfer/splash>

Smith, Merritt R. and Marx, Leo (eds) (1994): *Does Technology Drive History? The*

Dilemma of Technological Determinism, Cambridge, MA: The MIT Press.

Ungerer, Jameson L. (2012): “Assessing the Progress of the Democratic Peace Research Program”, *International Studies Review* 14, 1-31.

Waltz, Kenneth N. (1986): “A Response to my Critics”, in: Robert O. Keohane (ed.): *Neorealism and its Critics*, New York: Columbia University Press.

Waltz, Kenneth N. (1979): *Theory of International Politics*, Boston: McGraw Hill.

Winner, Langdon (1986): *The Whale and the Reactor: A Search for Limits in an Age of High Technology*, Chicago/London: University of Chicago Press.

Winner, Langdon (1977): *Autonomous Technology: Technics-out-of-Control as a Theme in Political Thought*, Cambridge, MA: The MIT Press.