

The Rise of Big Data: Its Implications for Security Studies

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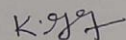
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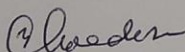
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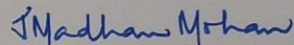
I declare that the dissertation entitled "The Rise of Big Data: Its Implications for Security Studies" submitted by me for the award of the degree of **Master of Philosophy** of Jawaharlal Nehru University is my own work. The dissertation has not been submitted for any other degree of this University or any other university.


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CERTIFICATE

We recommend that this dissertation be placed before the examiners for evaluation.


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Dedicated to Late Professor. S. P. Thangavelu, the
ever charitable mentor of innumerable students

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CONTENTS

Chapter 1-	1- 11
Introduction	
 Chapter 2-	 12- 26
Datafication and the potential of Big Data	
 Chapter 3-	 27- 44
Security in the New Age	
 Chapter 4-	 45- 51
Big Data and the Security Narrative	
 Chapter 5-	 52-54
Conclusion	
 References	 55-60

CHAPTER 1

INTRODUCTION

The massive amount of datasets that are produced through human interaction with the digital world, is an oft unexplored area that could potentially hold within itself, huge security implications. The enormous volumes of such data that are processed and analysed for useful patterns, commercially, characterise what is widely known as 'Big Data'. Such data by its very constitution, are beyond the capability of human processing and are automatically relegated to the area of analysis by powerful computers, which operate on advanced algorithms. Concerns surrounding the security implications of Big Data, while still at a very underdeveloped stage, have come to gain contemporary attention for the huge opportunities and dangers, present over and above its primary domain of commerce.

Technology as a variable that influences the phenomena of international change, and also the notion of security within and between states, is something of an omnipresent element throughout the literature of modern history. Before setting out on the path to do a wider study on the impact of technology in international change, the need to establish the link they have had, throughout the development of International Relations as a discipline is an important one. Industrialization- induced warfare and its destructive potential, is a central element that pushed the formalisation of the discipline itself in the first part of the twentieth century. This trend continued with the invention of nuclear technology, and the subsequent nuclear attack on Hiroshima and Nagasaki, that ended the Second World War. Nuclear technology was perhaps even more central in the way it shaped the next great epoch in international relations, the Cold War. Since the last phases of the Cold War, two significant areas where technological change played a defining role, is in the evolution of global norms to govern the possession and use of chemical and biological weapons.

Under the broad term of technology, there are various manifestations of technical advancement in fields ranging from biological sciences to the informational sciences. The latter was a field that started growing rapidly from the 1970s, with the subsequent rise in

computing potential more than ever. The growth and proliferation of computing technologies, and the subsequent emergence of the internet was a significant stage of technological evolution, which entailed a radical shift in the way information was produced and consumed across a vast array of fields. This shift by design or chance, coincides with the end of the Cold War and marks the beginning of a new epoch in the field of security studies. Ever since then, different manifestations of computing technologies have emerged, and their role at the intersection of technology, security and politics have gained more and more scholarly attention.

The notion of 'security' has been a historically muddy space where competing notions define 'security', through the lens of various schools, within the broader discipline of International Relations. The study of war in the early twentieth century started to produce bodies of literature that were primarily concerned about the military security of states. This idea of security remained, and still remains dominant to a large extent, in what was later constructed as 'security studies', a sub-field within International Relations. Military security, primarily being the realm where the 'threat of use of force' is exercised for political ends, slowly and gradually gave way for a much more different yet ambiguous and interrelated notion called 'national security'. The discourse around 'national security' changed the focus to the state as the central element, and the protection of its institutions from external and internal threats as its primary objective. With the entrenchment of the liberal international order in the mid-twentieth century and the emphasis on matters of human rights, a substantial body of literature brought the idea of 'human security' to the fore (Haq 1994). The protection of individuals within states from the different kinds of threats acquired much more attention that 'human security' started to become a definite and significant form of security. Questions around the 'emancipation' of individuals and communities, came to be represented very strongly by the critical school of security studies ever since the end of the Cold War (Horkheimer 1972: 246). Demystifying the state as the basic unit of reference, and capturing social elements that continue to act as obstacles in the quest for emancipation have characterised 'critical security', and it seeks to address concerns of security that are rarely addressed by the rationalist schools. It is in such a context, that we are made to look upon certain changes that continue to happen in the wider security environment.

Security:

There have been multiple attempts at defining security, which ranges from the absence of insecurity to the freedom from want and harm. These attempts have been continuously made, with regards to the prevailing context of international security in different periods. Keeping up with the evolution of a 'new age of data' and the subsequent change, the notions of security have to be adequately captured before setting on the path of defining security for the newer age.

The primary concern of David Baldwin in his seminal work on the 'concept of security' captures the fresh thinking that emerges around the end of the Cold War, that characterise the discipline of security studies in contemporary times. It revisits many basic questions that surround the notion of security, and tries to impart conceptual clarity to an issue area that is by and large left unaddressed by many of its proponents. The disentanglement that Baldwin tries to offer is from the 'empirical and normative concerns' that have come to replace any reasonable conceptualisation of security (Baldwin 1997:5). The concern about the ambiguity that is presented in the idea behind 'national security' is an important one (Wolfers 1952). It is from here that Baldwin takes the thread of the need to specify values that in turn determine security.

'Conceptual clarity' forms the bedrock of Baldwin's approach to the 'concept of security'. This is when he brings in the criteria where concepts have to be operational in the broadest sense, establish definitional connections, draw attention to theoretically important issues, not hinder empirical analysis and explained well in ordinary language (Oppenheim 1975). On comparing this with other approaches towards security, he sees the need for greater emphasis in their work towards the question of 'what is security', rather than that of 'what determines the value of security' (Buzan 1991). Handling security as an essentially neglected topic within the scholarship of security studies is a stark observation, that immediately leads to the widely held notion that security is an 'essentially contested concept' (Baldwin 1997). W. B. Gallie's idea of security as an 'appraisive' concept is erroneously assumed to be natural, though it forms the basis of the neorealist school's approach to security (Gallie 1956: 171). While contestation should have a vibrant debate around a concept, such approaches are taken to be a given, that only muddies any clarity

that can be gained. Baldwin at the end, questions the very nature of contestation on the ‘concept of security’ and describes it as a ‘confused or inadequately explicated’ topic (Baldwin 1997: 12).

The quest to engage with the specifications for security is thoroughly dealt with, by trying to reformulate it into questions of ‘Security for whom?’, ‘Security for which values?’, ‘How much security?’, ‘From what threats?’, ‘By what means?’, ‘At what cost?’, and ‘In what time period?’ (Baldwin 1997). Baldwin quite correctly does not make this set of specifications exclusive, and leaves its formulation with regards to the particular research area. In the end, he is quite clear about the objective he initially sets out with, to explicate the concept of security. Notions that are conflated with that of security are to be sufficiently taken out of the question of ‘What is security?’, and this need not in any way affect the empirical and normative concerns built around it.

Security, being such a complex entity, has to be seen in an entirely different light with the advent of digital revolution. Linking traditional security with that of cybersecurity is something that has begun recently, because of the variability of technological change and the myriad opportunities and costs it throws. A deeper analysis of the cyberspace and its attributes that is relevant to security lacks clearer understanding, along with its manifestations in various forms.

Cyberspace:

The emergence of newer arenas of international competition such as the cyber domain, is a fact that is hardly understated these days. This has brought newer opportunities and challenges to the international order after the end of the Cold War in myriad ways and distinct in form, from that seen before in time. Nazli Choucri’s ‘Cyberpolitics in International Relations’ marks an important turn in the empirical and theoretical study of the Cyber domain from the standpoint of International Relations. While the impact of the Cyber domain is global today, appreciation of its relevance to international interactions between both state and non-state actors have been limited, seen in the huge lag of theory in comparison to established practice. Choucri’s work makes a significant attempt in bridging this gap, by creating varied conceptions of the Cyber domain and realization of its drastic break from twentieth century categories of analysing International Relations.

Choucri sets out with the task of conceptualizing a domain that is ‘virtual’ and ‘human-constructed’ in nature, which has grown hugely important for both economic and security considerations of industrialized and developed states in the first place and the newly developing states and the other states in that order. She defines Cyber politics as, ‘the conjunction of two processes or realities— those pertaining to human interactions (politics) surrounding the determination of who gets what, when, and how, and those enabled by the uses of a virtual space (cyber) as a new arena of contention with its own modalities and realities’ (Choucri 2012: 4). This combines the definition of politics as the ‘authoritative allocation of values’ (Easton 1953) in society, with ‘who gets what, when, and how’ (Laswell 1936) and builds the foundation of cyber politics from this reference point, and carries it forward throughout the book.

The dynamic nature of the Cyber domain from that of the traditional domains of International politics, prompts Choucri to look at it from the vantage points of three schools of thought namely- Realism, Constructivism and Institutionalism. Though the durability of the state as a primary characteristic in the traditional domain continues well into the Cyber domain as well, it does undergo varied changes which while is hard to capture fully, evokes interesting arguments. While one line of thought might argue that political activism enabled by the Cyber domain erodes the authority of the state, it is equally true that newer tools for the increase in its power and surveillance capabilities are a reality. This means that it is not fully clear yet as to what might entail as ‘Cyber security’ in substantial terms.

Also outlined is the theory of lateral pressure- ‘an empirically grounded approach to change in international relations— to explore the emergent parameters of real and cyber international relations in the twenty-first century’ (Choucri 2012: 17). Along with the three images or levels of analysis in traditional International Relations, the theory also proposes a fourth level known as the global level. This newest addition is conceived as one that impacts the global system consisting of both natural and virtual realities. Its usefulness in emerging discourses of environmental sustainability and global governance are dealt with, adding to newer layers of analysis. The other radically significant foundation of the Cyber domain, is the growing significance of knowledge at the base of most of the international economic interactions and its ripple effects.

Observation at different levels of analysis namely the individual, the state, the international system and the global, yields a rich and diverse amount of new information in locating the impact of the Cyber domain. The empowerment of the individual in the Cyber domain places the first level at a greater emphasis than ever before as it is individuals or groups of individuals in various forms such as private entities and NGOs that dominate the everyday functioning of the Cyberspace, after its commercialization at the end of the twentieth century. At the second level that is the state, the application of the theory of lateral pressure throws varied profiles of capabilities, placed at different positions within the wider international system, that engages in cyber activities at varied levels (Choucri 2012: 92). The level of the international system is the venue of both contention and cooperation influencing cyber issues such as the internet architecture, competitive cyber politics and militarization of the cyberspace (Choucri 2012: 127). The real challenge for theory and policy emerges at the level of the international system, where the virtual domain's values and stakes are not clearly defined. Cooperation in the management of Cyberspace is seen in line with the historical trend of international organization and creation of norms for international cyber interaction, but in an uneven and complex manner because of the number of stakeholders involved. This posits the management of the Cyberspace in a global context as it evolves and hence, the innovative new level of global analysis is introduced. The addition of the global level is consistent with newer conceptions of the various spaces, including Cyber in unison, as one that sustains life (Choucri 2012: 209). At this level, a comparison of the management of Cyber domain, as similar to that of the environmental domain is shown as a very useful construct at the global level.

Big Data:

A cyber domain that has implications at a possible fourth level of analysis, does so through a new phenomenon that comes into play and go on to create a potential 'paradigm shift' (Kuhn 1962). One such phenomenon is 'Big Data', that is capable of widespread change and is observed to have an impact, that is as of yet not fully understood. Understanding this requires the development of varied conceptual tools and newer forecasting techniques. More than traditional concerns about security from a rationalist point of view, understanding it from a reflectivist angle makes more sense. This, like discussed earlier, is

because of the increased influence of the individual level of analysis and the greater degree of attention that a critical theoretical perspective might offer. As a phenomenon with a definite footprint on the global level of analysis, it is from this angle that Big Data has to be studied for wide ranging security threats.

The rise of Big Data as a phenomenon in contemporary times, require deeper attention according to Rob Kitchin (2014), primarily because of the deeply disrupting potential that it accords to how we look at huge volumes of data. While the production of such data is already known in many other fields, its increasing relevance in data processing and analytics are beginning to have an impact across multiple fields and disciplines. Unlike traditional methods of data analysis that had to contend with ‘scarce, static, poorly relational data’, Big Data is generated out of highly relational data that are either structured or unstructured (Kitchin 2012: 2). The vast and exhaustive nature of Big Data poses a huge challenge in analysing it, and more importantly this is done without any specific question in mind. Techniques of machine learning and building predictive models, provide with algorithms that engage in a near automated manner in detecting patterns out of data. This leads the author to argue that a new epistemological approach can possibly spring out of the changes that follow Big Data analysis. Kitchin brings in the Kuhnian idea of ‘paradigm shift’ to capture these changes, despite the critiques around it and places it is known as the ‘Fourth Paradigm in Science’ (Gray: 2009).

From this point onwards, approaching Big Data comes in two ways where one looks at it as ushering in a ‘new era of empiricism’ that is ‘free of theory’, and the other focused on finding out explanations for making sense of the world and reality (Kitchin 2014: 3). One of the big challenges with respect to predictive analysis is that they are constructed with an objective to predict the world from the data, rather than at explaining or understanding it. The first school which is overwhelmingly dominated by business and the industry also falls prey to the exogenous impact of Big Data, and conflate them to a point where they think that the scientific method has become obsolete. Capabilities in recording and processing data like never before, leads them to believe that data can speak for itself and free of human bias. Kitchin rightly points out the dangers in such an approach, where he says that even though Big Data tries to capture exhaustive volumes of high resolution data, ‘it is both a

representation and sample, shaped by the technology and platform used' and is subject to sampling bias (Kitchin 2014: 4). The scientific method still holds sway over the designing of algorithms and the strategy employed to detect patterns. The assertion that domain-knowledge is not needed anymore to analyse such data, and the patterns emerging out of it is also problematic, as they bring out the same pathologies that the behavioural revolution brought out in the past. The other approach that is called as 'Data driven science' uses a synthesis of abductive, inductive and deductive methods to arrive at conclusions (Kitchin 2014: 5). The abductive method is an epistemological strategy where the existing body of knowledge is used to build hypotheses and identify potential questions, rather than plainly using an inductive method on random datasets to find useful patterns (Kitchin 2014: 6). C.S Pierce puts forth the abductive method that 'seeks a conclusion that makes reasonable and logical sense, but is not definitive in its claim' (Miller 2010). With this, Kitchin also acknowledges the limitations to the potential that Big Data holds for the humanities and social sciences. The deep enmesh of Big Data analysis with positivism, offers both opportunities and challenges for the post-positivist scholar where the availability of newer analytical techniques bring together a vast range of data from various interrelated fields, and careful application of the inferences also immensely matter. Same holds true for what Kitchin calls 'computational social sciences' where the need for deep conceptual knowledge and social theory makes the idea of detecting patterns as a 'starting point', rather than an end that creates value by itself (Kitchin 2014: 7).

Big Data's engagement with the social realm, that includes complex and unpredictable human behaviour, should certainly depart from the positivist leanings of its origin and complement the understanding on depth and context, along with associations and causality. Critical GIS is a potential example to look up to, where quantitative techniques are used with full knowledge of their limitations, while the scholar is aware of one's positionality by situating debates in the relevant intellectual landscapes, and mindful of the techniques and methods used (Kitchin 2014: 9).

The hypothesis that has been formulated for this study are as follows:

1. The construction of Big Data techniques and its epistemological impact have huge implications for the field of security studies, and the reflexivity needed to fully

understand their implications is absent because of the neorealist assumptions deeply embedded in security studies.

2. Big Data, as a tool that is popularly assumed to take away freedom and liberty, can be positively used from certain critical vantage points and also hold the possibility of alternate modes of knowledge production.

The research questions that has been proposed for the study are as follows:

1. Does the rise of Big Data as a phenomenon influence the notion of security, make it acquire newer dimensions?
2. To what extent can the complementarity that Big Data gives in the generation of new knowledge, be used in a way that has the potential for social transformation?

The inferences obtained from the study are as follows:

1. Big Data has very important epistemological and ontological impact on security studies and can be seen to carry forward neorealist tendencies that were already present.
2. Big Data gives an image that is unclear on the denial of freedom and liberty from the individuals. The phenomenon needs to be studied further in future to come to a conclusive evidence that it can create deep insecurities.
3. Social transformation is seen to partially come along with newer modes of knowledge discovery and better access to data processing infrastructure to have a truly bottom up approach

The research methods figuring in the study are explained below:

Studying the social aspects of Big Data and its implications for Security Studies involves an interdisciplinary approach right from the outset. Conceptualising Big Data and the

associated process of Datafication in terms of their social relevance forms the first part. The social aspects of a highly technical phenomenon like Big Data, is primarily looked through the methodological impact it has over traditional methods of statistics. This further looked at through the social manifestations of Big Data and a qualitative approach is employed for the purpose. Qualitative approach is helpful here especially because the social relevance of a technical phenomenon has to be able to understand to what extent it is value-laden. After explicating the different theoretical schools of security studies, mixed methods are used to understand how Big Data poses relevance to Security Studies through the framework of the 'levels of analysis', emancipation and social transformation models of critical security studies school.

Organisation of dissertation:

1. Chapter One- Introduction- This chapter deals with the significance that the intersection of technology, society and security has been gaining in recent times, and the construction of a possible research design.

2. Chapter Two- Datafication and the potential of Big Data- Broad trends that have given rise to the phenomenon of Big Data and the associated process of Datafication, and their future forecasts will be placed in a broader theoretical framework. Their relevance for security studies will be dealt in depth in this chapter.

3. Chapter Three- Redefining security in the New Age- Security as a dynamic concept that evolves with the rise of newer, overarching variables, and the approach of different schools of thought in their intersection, will be carried out in this chapter.

4. Chapter Four- Big Data and the Security Narrative - The newer practices of handling vast amounts of data offer vast opportunities and challenges with varied impact on any dimension of security. The question on the perpetration of established notions of security, and the potential to institute change in newer conditions will be addressed in this chapter.

5. Chapter Five- Conclusion- The assessment of Big Data, its practices, the culmination of related security narratives, and the outlook they hold for future will be discussed in this chapter.

CHAPTER 2

DATAFICATION AND THE POTENTIAL OF BIG DATA

2.1 INTRODUCTION:

‘Revolutions in science have often been preceded by revolutions in measurement. -Sinan Aral’ (Cukier 2010).

The collection and storage of different kinds of data, is an endeavour that can be traced from the origin of human civilization. The term ‘data’ is borrowed from Latin, that means ‘given’, and had picked up the meaning of information in later times. Beginning from primitive ways of data collection to the evolution of modern statistics, humans have found significant value in understanding what a bunch of data puts out. As data collection and processing techniques continued to improve, inventions such as the punching cards were used in various large scale projects, among which the census conducted by governments was the most important one. Ever since the 1980s, the invention of Internet and the associated growth in the mammoth generation of data, about various things and entities, has led to the popularisation of what is now being called as ‘Big Data’. Big Data, has since been widely employed for various manifestations of data generation, and the slow and steady impact it has had at various levels of society. While we are still witnessing the effects that are being engendered by such a phenomenon, it would only be prudent and useful to study it right from the early stages of its evolution. The quest to record and measure the different aspects of observable physical phenomena is considered to be the starting point of data itself. Even before the invention of modern computing this has been a well-entrenched legacy throughout human history, serving a multitude of purposes. The only variable that continually has changed over this long period of time is the complexity and the magnitude of the endeavour.

Firstly, we look at possible ways in which, the terms Big Data and Datafication can be satisfactorily fleshed out and employed in this work. Big Data means multiple things in

multiple contexts, but it is observed to have traits that undergird its emergence, that has a common social context that influences both the individual and the collective. Next, we shall look at the different ways in which Big Data is said to create many changes to the existing scientific method by creating a new future for induction, effect on the method of sampling and the privileging of correlation. This is an important exercise as these attributes of Big Data are considered by its proponents to free knowledge creation from traditional methods to a revolutionary phase. We then look at the manner in which Big Data has come to play a major role in engendering risks and challenges in its wake, that can be detrimental for the continuation of existing social problems as well as the creation of newer problems.

2.2 CONCEPTUALISING BIG DATA AND DATAFICATION:

The contemporary definition of the term, Big Data, has been defined variously, in different contexts. It is something that is still up for academic consensus and has to be understood in the context in which it is deployed. Now we shall see how Big Data and the term closely associated to it, Datafication, can be conceptualized for the analytical purposes with regard to security studies.

Big Data:

The historical process that enabled the crystallisation of what is today called as Big Data is something that has to be looked in-depth from different angles. While data collection and storage has been an established practice for millennia, the emergence of modern statistics propelled the need for better techniques in handling them. From a particular point during the peak of the industrial revolution, the demand for quicker processing of vast amounts of information on the growing population required states and other entities to actively pursue improvements. Since the mid-twentieth century, increasing computing potential directly leads to the growth of relational databases in the 1970s, which is considered to be the most useful form of data storage, which had created a revolution in

modern computing¹. Beginning from the 1990 onwards, the amount of data produced in the digital medium goes through an explosion, leaving the amount of non-digital data produced from the beginning of human civilisation to a paltry two percent of the total (Schönberger and Cukier 2013: 9). Cox and Ellsworth (1997) of the National Aeronautics and Space Administration (NASA) for the first time delve into the ‘problem of Big Data’, because of an increasing amount of input data into the supercomputers of the day. We shall now see the different ways in which the phenomenon of Big Data has been explained from this point onwards.

Rob Kitchin, (2013) details the parameters of Big Data as --

“huge in *volume*, consisting of terabytes or petabytes of data; high in *velocity*, being created in or near real-time; diverse in *variety*, being structured and unstructured in nature; *exhaustive* in scope, striving to capture entire populations or systems (n=all); fine-grained in *resolution* and uniquely *indexical* in identification; *relational* in nature, containing common fields that enable the conjoining of different data sets; *flexible*, holding the traits of *extensionality* (can add new fields easily) and *scaleability* (can expand in size rapidly)” (Kitchin 2013).

The important inference from this explication of Big Data is that, it characterises features that are over and above the singular factor of volume. The real-time production of data through the form of images, audio and video from various sources is a very different method of data collection from traditional methods. Effects of this on traditional research methods like sampling is a very interesting one, to which we shall return later in the section. Such generation of highly unorganized and unrelated data of enormous quantity was very difficult to process and extract information out of, for a long time. This is possible today with the kind of computing potential available and the societal implications of the multi-

¹ Edward F. Codd (1970), lays out the mathematical function of the relational database that stores data in the format of rows and columns in a highly structured format. It enabled easier organization and retrieval of data stored, without the difficulty of needing of trained expertise, as was in the case of previous data storage models.

dimensionality exhibited by this new kind of information, is something that is very important from the future perspective of knowledge production.

One approach to Big Data asks researchers to see it from the vantage point of the kind of changes it creates in existing research practices. It has been talked about broadly in three ways, where the emphasis has been placed on collecting and using a lot of data rather than a smaller set of data (where smaller set of data is characterised as that of an older, data scarce era), shedding preference for highly precise data, include messiness and giving up on the search for causation along with looking for a higher quality of correlation (Schönberger and Cukier 2013). At a slightly different level, Anderson (2008) went on to make a controversial claim that the rise of Big Data created a fundamentally new world of empiricism that can do away with the practice of theory-building. Correlation is seen as a higher ideal to achieve, than the quest for causation, however elusive it might be. This gives a positivist spin to the epistemology that is sought to be created around the phenomenon of Big Data. While the idea that Big Data as a tool can be qualitatively used for a larger purpose is welcome, looking at it from a problem-solving approach may not reveal the entire picture.

This is where Boyd and Crawford (2012) look at the phenomenon of Big Data as one that constitutes the interplay of three factors namely: *technology*, which has huge computing potential and the accuracy to look through and gain information out of large databases, *analysis*, that can mine patterns in these large databases and hence make economic, social, technical and legal claims out of it and *mythology*, which creates the belief of a ‘higher form of intelligence’ by generating knowledge where it was not possible before, along with the ‘aura of truth, objectivity and accuracy’. They make a very powerful statement through this, exhorting researchers to question ‘Big Data’s models of intelligibility’ prior to their ‘crystallising into new orthodoxies’ (Boyd and Crawford 2013: 666).

Datafication:

The processes that the rise of Big Data engender is something that is yet to be captured in any certainty. But there is a need to bring these changes under a broad terminology that can adequately define them. The rendering of various facets of physical reality in a data format is simply called as Datafication (Schönberger and Cukier 2013). Normann (2001) explains datafication through three ideas namely, *dematerialisation*, which is the separation of the ‘informational aspect’ of physical entity in the digital world, liquification, manipulation and repackaging the dematerialised information in ways that were traditionally not possible, and density, ‘(re)combination of resources’ for particular value additions in particular contexts. This can be best described as the logic that prevails in the information technology sector, where value creation chains enabled in such a way through the digital world is much more efficient in capturing information that can be useful in expanding businesses. Such an instrumental logic that prevailed during the beginning of the data revolution are increasingly used to define a future ideal world, that is ‘networked’ and works around the principles of seamless efficiency, in capturing and utilising interconnected digital devices and the data that flows between them. Analysis around such an idea of datafication have generally considered that such data’s frames of reference are selected without much consideration to its pre-existing frames of reference, which can decontextualize and distort knowledge production (Lycett 2013). Datafication will undoubtedly change the way in which we sense the world and would create and leave out many aspects of the world in its progression, along with the emergence of potentially a new way in which reasoning and deduction are carried out.

The human desire to quantify physical reality has always moved from one frontier to another, and datafication represents breaking into a very new and potentially revolutionary frontier. Schönberger and Cukier (2013) show various examples of such ideas in the past, such as the invention of time, distance, area, volume and weight, all of which quantified reality and derived value out of it. The idea of datafication not only uses the aid of mathematical techniques to find value in places where it is not present, but is also about how to compute them accurately through the correct means. The pervasive impact of such

a concept is widely seen today, that its effects on society is unquestionable. The collection of personal attributes of large number of citizens from social media and their direct impact in political campaigning for the elections of various states is perhaps the best contemporary example (Cadwalladr and Graham-Harrison 2018).

2.3 IMPLICATIONS OF A BIG DATA ENVIRONMENT:

As Big Data emerges and its influence slowly starts to seep into society, we are at the cusp of yet another technological phenomenon making its way into the discourse of social change. The ways in which this process unfolds will undoubtedly be multiple in number and complex in nature. Its impact has been looked at, from both an overwhelmingly positive angle as well as a cautious angle. That way, the implications of Big Data is embroiled in a major methodological debate that involves the re-evaluation of traditional techniques employed in social sciences.

Induction over Deduction:

The traditional focus in social sciences, in terms of theory building, had evolved in a manner where induction and deduction are employed variably for better outcomes. But it is also true here that deduction has generally had an upper hand as the preferred method, as induction often led to faulty proposals due to the lack of enough data. The core change that Big Data enables in research programs is the introduction of a large data set, which basically converts the ‘N’ problem into something large. Induction, by virtue of being the logic of inference gained through observation of many cases take a larger role in Big Data led studies. Also, the conventional understanding of a dataset in traditional research is taken as the mean of a normal variable that comes within. Lee and Martin (2015), go on to say that multiple trends in the same dataset can be inferred on segments of the entire dataset, accurately- through induction, rather than the utility of the average.

The other major impact is upon the idea of hypothesis testing. Going into a research problem with pre-set categories and looking for particular answers has been the standard approach used widely. One of the more famous phrases that come from the field of data

science is to let the ‘data speak for itself’, which is in turn premised on the concept of predictive analysis, a productive outcome that is embedded within the Big Data context. The supposedly invisible categories that might hide under the huge volumes of unstructured data, lie dormant to the eye of a general surveyor, and that has the potential to show itself. Goldberg (2015) elaborates this by saying that ‘we no longer need to come to the crime scene with an idea about the identity of the killer’. This can be characterised as the optimism of the data scientist against that of the social scientist, who operates out of a deduction- driven approach to statistics.

Induction and its supposed applications have generally been a non-starter for the social scientist, and its outcomes are considered to be ridden with logical fallacies. The dominance of a presupposed theoretical model, which is aided by a deduction-led hypothesis generation has been the hallmark of a world with insufficient input data for the induction leaning scholarship. For them, the close observation of a phenomena precedes the application of theorization. Induction then, has been classified into two types which are, enumerative induction and eliminative induction (Dehmer and Emmert-Streib 2018: 334). The former is considered to be the form of induction that had continued to be practiced for a very long time and the one that is based on ‘mere repetition of phenomena’ (Dehmer and Emmert-Streib 2018: 334). Eliminative induction hence is a possibly different approach, where inference from the ‘variation of circumstances’ holds primacy (Dehmer and Emmert-Streib 2018: 339). The quest of causality, while is not a direct result of such an inductive approach, is deduced from the tweaking of the variables used. This is further confirmed through a method called ‘method of difference’, where the occurrence of a phenomenon in one occasion and its absence in another, along with a common factor that happens in the former occasion, and the scenario in which the two vary should constitute the cause or effect of the phenomenon (Mills 1886). This being constituted as a core part of eliminative induction, it still remains a largely sketchy project that is yet to find many takers.

Sampling:

The usage of sampling as a statistical method in social sciences is a historically important one. It had added value in research environments for the approximate representation of a larger phenomenon. Randomness was an instrumental feature of sampling that provided this approximation in an environment of lesser data. Its endurance in research programmes has been for a very long time and the arrival of Big Data has had some impact on its utility today. The idea of accepting ‘messiness’, as given by Schönberger and Cukier (2013), is considered to play a very important role with regards to sampling. Big Data, by its very nature, exists in the format of unstructured data of varying formats, with apparently no value at the face of it. A fundamental change in the way this data is processed, owing to the growth in better data handling techniques, forms the crux of Big Data’s value addition. It enables the mining of data at ‘different levels of granularity’ and has enabled social sciences to move away from sampling (Schönberger and Cukier 2013).

The assertion that sampling is not necessary in a Big Data environment is heavily contested by social scientists, unlike the data scientists. To assume that Big Data can successfully tackle the problems of a world with lesser data is questioned from the beginning. Without the sample of a dataset, it does not matter what is the size of a particular dataset (Boyd and Crawford: 2012). The volume of Big Data never being the only important factor, there is the need for a reflexive approach to see how practices around Big Data are being shaped. The sources from which Big Data emerges, the tools used for the purpose, the software used for the extraction and finally the sample and methods used to predict patterns, all precede before the actual processing of Big Data for value. To claim that Big Data can ‘speak for itself’ before unpacking all these preliminary stages of data collection and storage, makes it only suspect to larger questions. Apart from this, contemporary Big Data practices conceived by data scientists have a lot of such unexplored black boxes, which ought to be deconstructed for the production of socially informed knowledge.

Causation and Correlation:

The dictum in statistics that ‘correlation does not imply causation’ has been a mainstay in various disciplines of knowledge production as well. The quest for causation, in the research problems one has in hand, is easily seen as something extremely difficult to attain. As discussed earlier, the dominant method of theory-building being a deduction influenced approach, scholars of data science believe that an induction-led approach that appreciates the variety of findings from correlations can be much more useful. This approach based on correlations is one that is probabilistic in nature and never precise (Schönberger and Cukier 2013). Big Data, according to them, engenders a radically different environment that helps in the aggregation of diverse data that are amenable for finding patterns and prediction. The role of hypothesis-making is reduced, along with the quest for traces of causation happening through the inductive path. Despite the promises, such an approach is always vulnerable to the problem of spurious coincidences and the difficulty in knowing what varying levels of correlations mean.

Predictive analysis is a crucial part of the purposes for employing Big Data, which can help us understand at least parts of reality. Big Data is also considered as the phenomenon that can be used to answer questions through correlation, by acting as an intervening agent. Coinciding with this, are the exposition of scholars, Schönberger and Cukier (2013), Anderson (2008), which says that correlations out of Big Data are powerful enough to understand phenomena ‘not by understanding how it works, but by identifying a useful proxy’. In essence, theoretical models and hypotheses are trashed for a sharper approach to correlation. Along with the idea of eliminative induction, approaches to causality are to be raised to a broader level. Kitchin (2013) does not fully agree and suggest that fields like data science benefit more out of an abductive method of reasoning, which reaches to conclusion on ‘reasonable and logical’ grounds but is not ‘definitive in its claim’. Further, abductive reasoning straddles a space between theoretical research and empirical analysis, and can be leveraged at the same time along with the operation of hypotheses (Goldberg 2015). Lee and Martin (2015) look at it as the construction of ‘cartography’ that includes

the construction of ‘question dependent, though theoretically organized, reductions of information to make possible the answering of many questions’.

The larger impact of Big Data in various spheres of society is an evolving story that is considered to hold a number of benefits and potential dangers. The most important takeaway from this is the fact that, in a Big Data world, methodological heterogeneity is affordable for the practitioners. The kind of epistemological changes that Big Data is set out to make are significant, but at the same time carry a number of problems along with it from the past. While the roles of a computational scientist and a social scientist look like they are pitted against one another, the truth is that, while the former wants to look at Big Data as unexplored, uncharted territory that seeks a liberating approach to discover new frontiers, the latter is cautious about the dangers from the past and insists on the grounding of the phenomenon in the social context from which it emerges.

4.5 RISKS AND BENEFITS OF BIG DATA:

With regards to effects that have begun to show in society, in terms of Big Data, it is in an infant stage and the process has only begun to take roots. It has been a steady process which has showed itself in moments of large scale occurrences, and impacted major parts of society, judging its wider role and the resultant implications need more time to be definitely determined, which should be based upon a continuous evaluation and research. It is a potential advancement which means that, it has the capability to transform on a wider and deeper scale as and when it encompasses more aspects of physical reality, which is slowly happening. Its effects can be known and studied after this with even greater clarity and grounding. With what we have in hand at the preliminary stage of growth, at a practical level, it is only limited to certain fields which are transforming with its different aspects. In the sense, Big Data has not matured to the level where its direct effects can be completely gauged. Since it is presumed to play an important role in very many other fields, a head start is required in the quest to answer the questions that arise around Big Data practices, which is what we presently are encountering.

Data collection is hard and time consuming. Inputs employed are technical in nature and various methods exist for the process of its gathering. Historically speaking, access to data, its collection and its utilisation has been a tedious task. The emergence of Big Data makes this task appear simpler. In the process, precious details about who has access to this data and for what purposes they could be used has never had a clearer answer. Sources from which disparate data are taken, and the tools used to process this large quantity of data are substantiated without adequately analysing its potential to create new forms of knowledge (Boyd and Crawford 2012)). This then makes the contention that traditional statistical techniques are obsolete, a particularly problematic concern. As a result, proponents of a 'superior' system of data collection and processing, acquire an attitude of discarding traditional data practices and methods at ease.

Schönberger and Cukier(2013) also contend that the 'value of data does not lie in its primary purposes but in its secondary purposes'. The idea of collecting personal data through the policy of 'consent' is presently the dominant idea in the data collection discourse. Primary purposes constitute the accumulation of data for various intended purposes and to its contrary, secondary purposes are those where data is reused either directly or indirectly by selling data to multiple players (businesses, states and their agencies) and cater their interests, which was never the original purpose of data collection. While the basis of data collection is about consent and limited purpose usage, the room for such explicit violation of ethics is deeply embedded within. The problem arises when the context of this approval of consent is not taken into account, where personal data is shared indiscriminately for various purposes that do not account how the data will be used for unknown secondary purposes in future.

Technology companies such as Google, Microsoft, Facebook and other corporations, states and their agencies are considered to be the major users of Big Data. Civil society access to the kind of Big Data they hold is not always a linear and easy path, for the experts and academics who wish to study them outside these places, or have advanced facilities to process such data. This creates a serious and unbridgeable divide between the vast majority of people who produce data about themselves and entities that hold and use their data. It is

also a fact that ‘the difficulty and expense of gaining access to Big Data produce a restricted culture of research findings’ (Boyd and Crawford 2012). This raises serious questions with regards to the democratisation of access to Big Data and the kind of knowledge produced. It gives rise to the production of knowledge by a particular few in particular contexts and to the detriment of the vast majority of people. Not only does it violate the principle of ‘democratisation of access’, it also leads to the loss of diverse inputs from other reflexive sources that enable the construction of socially inclusive knowledge. Finally, Big Data being the product of a specific moment in the process of technological evolution, along with the desire of the states and corporations to use them for specific interests, the role of academics in accessing and studying it and enlarging its scope has become an imperative. Data access benefits for researchers and academicians cannot be less emphasized. Hence, changing Big Data studies into a much more productive research program becomes an absolute necessity for a socially responsible utilisation of technology.

Big Data is becoming a tool that is increasingly being used for the prediction of human behaviour. This can be predominantly observed in the economic realm, where it is used to predict from vast amounts of customer data, for profits in business. Similarly, data about various behavioural aspects of people are collected to explore attributes such as credit worthiness, insurance and overall financial stability. The most egregious examples of indiscriminate data collection about people include collection of social media user-profile data, for the benefit of various political entities in elections across the world. This raises not only social and political risks of Big Data usage, but also espouses moral and ethical concerns. These concerns have also become more complex over time and have morphed into security risks. Another important facet of Big Data is the idea of ‘penalties based on propensities’, which is the increasing usage of Big Data predictions for the purposes of judging human behaviour and punishing them even before the commission of an action (Schönberger and Cukier 2013). This is possible because of the manner in which tools used to collect Big Data are deeply embedded in the various digital artefacts that an individual uses, such as applications in smartphones and the various transactions over the internet. Therefore, everyday uses of digital technology has also reached a higher-level of functioning. The biggest issue comes from the fact that states and societies have started to

normalise this particular way in which Big Data is utilised, and in other instances more openly in the guise of security threats. It gets normalised into the psyche of individuals and groups, by a set of practices that evolve without much conscious investment in the process. This development has caused manifold convolutions in the perception of security threats and how it operates in a gamut of social realities. This goes hand in hand with an aspect of modern society, where control and prevention of ‘unhealthy or risky behaviour’ should be identified and stopped for the larger good (Schönberger and Cukier 2013). Predictive analysis furthers such discriminatory practices and goes to the extent of reifying pre-existing issues in society. Such usages of Big Data predictions are becoming an important sources of risk, threat for individual and her privacy as well as that of the collective.

One of the core outcomes of Big Data analysis is the ability to capture different characteristics of physical phenomena and its attributes in the format of data, which acts as an immensely powerful tool which has never existed in history, at this scale. The key question to be asked here, is whether with the rise of such capabilities, has there been a parallel rise of normative evaluation of such capabilities. While on the one side there is a powerful rationale to utilise this data in the quest to add value to knowledge, to what extent it can be carried out is still unclear. This discussion reveals the situated unclarity and ambiguity in the nature of Big Data, as also delving deeper into its normative concerns. This opens up a Pandora’s Box of other issues, that go beyond the boundaries of this topic, but which at some level must be kept in mind to unravel its full competencies.

The issues of ‘technology design’ have been historically observed as an intrinsic factor that affects all sorts of technological artefacts in the modern world. This leads us to a crucial question about the technological design behind these artefacts, which includes Big Data as well. It often is the site that holds great promises and grave dangers, and where the true potential of any emerging technology can be fully identified. Touching upon different aspects of Big Data as discussed above, we can come to an understanding that the design of Big Data practices has been accepted uncritically till this point in time. Developing best practices in technology design in the field of data studies, nevertheless, can be as challenging as they are in any other technologies. The misplaced optimism of Big Data

proponents in developing a new framework for the future hence, becomes a critical site of contestation and problematisation.

Instead of the simplistic framing that Big Data represents a revolutionary and liberatory moment in finding hidden values that were once invisible, a thorough research program on its emancipatory potential and creative uses have to be fleshed out. The further exploration on unpacking of the phenomenon of Big Data and its associated ideas is hence the need of the hour, as explained by the various scholars studying it. Big Data is juxtaposed in a highly dynamic situation whereby, comprehending its nature in terms of simplistic ‘good and bad’ effects hardly can lead us to a real understanding and theory formulation.

2.5 CONCLUSION:

The future effects of Big Data is something of a continuously evolving picture, unlike the evolution of many other technological phenomena. The ramifications of its potential, will possibly be understood better, only after the higher diffusion of Big Data practices in society. What we have witnessed till now is largely a change in the way businesses operate and the desire of states to use such the values from such a large cache of data. Predicting consumer behaviour and market trends for profit motivations and increasing economic potential have been the mainstay of Big Data applications. It is slowly and steadily making its way into newer areas such as health, environmental security, urban planning, internal and external security of states and forecasting services of different hue. Interestingly, the security aspect of Big Data analysis is something of a mystery, ever since the idea of ‘broadening and deepening’ of security studies took root since the end of the cold war. Big Data’s role as an artefact that impinges on the security of states can be seen as a part of the politicisation of the cyberspace in recent years. We shall deal with this in Chapter 4, where we discuss, how Big Data has shaped new security narratives that are a result of rapid diffusion of technology in society.

Perhaps what is even more important in the era of Big Data is the new reality, where people are arranged in a new socio- technological universe that produces valuable data about

themselves and the lack of knowing what it exactly means. It creates newer notions about what constitutes the 'public', because people today identify themselves in various digital platforms (including social media, online media viewership, etc) as groups of people exhibiting a particular kind of taste and group behaviour. This necessitates the need for a much wider literacy campaign on the new social worlds that people knowingly create through the generation of large quantities of data.

As discussed earlier, Big Data has also been at the centre of an impending epistemological change driven by the vast swathes of unstructured data. While a preliminary study has been carried out to analyse the effects of such a change, a great deal of work would only be seen in future, as Big Data practices mature. For a phenomenon that can cause massive social change, and dominate and prevail over traditional data practices in statistics, there is an urgent need to unpack how it is sought to be constructed and operated. Hence, studying its impact from the initial stages of its evolution has become indispensable.

CHAPTER 3

REDEFINING SECURITY FOR THE NEW AGE

3.1 INTRODUCTION:

The global community faces myriad complications due to the nature of the international sphere. In the contemporary world concepts of the state have undergone a profound transition. The state is a unit of critical relevance as more and more aspects of international concern are confronting it and thus, requiring a deeper and a more congruent understanding of its various components. Sovereignty has been widely under attack in the recent past by various kinds of security threats that have emerged post-cold war. The meaning of security has come to occupy a central stage in the simmering debate in security studies for decades now. However, the lack of an agreeable definition indicates the complexity and dynamism of the field. The study of security has played a vital role to understand traditional problems of conflict and the changing nature of international relations. Many unforeseen phenomena affects security, constituting a dimension of life and sub-field of international relations (Rosenau 2006). The allusion to security is inevitable in all societies and contexts. It has come to acquire an expanding meaning in the contemporary world, and due to the altering nature of global systems, it becomes increasingly imperative to study it closely while considering its multi-faceted aspects. Security studies has come to acquire a meaning associated with an area of inquiry addressing fundamental questions; ‘the answers to which have changed, and will continue to change over time’ (Williams 2008).

The most profound element of the cold war period was defined by intense political and economic rivalry. The spill over of which was seen in the military sector, as well as resulting in an arms race which led to the production of stockpiles of nuclear weapons (Malik 2015). Eventually the international system came to be defined by war and conflict as its primary feature, due to the characteristics of the cold war. This also led to the agenda for survival trumpeting over other concerns, and a condition of anarchy was established as a norm, which promoted states to look for their preservation through security. This would be reached by securing resources, strengthening armed forces etc.

According to Ullman (1983) threats to national security are actions or events over a span of time, drastically leading to deterioration of the quality of life of people of a state. The concept of security has been everchanging. Since the aftermath of the Second World War, the focus of international relations has been security studies, with a particular focus on military strategy. While looking at a definition of the concept of security, it is important to also note the distinction that each definition is inherently aimed at. Buzan's (1991: 18) definition, that 'security is pursuit of freedom from threats', is a conceptual content that remains vague. It might seem from the name itself that security has a 'given' meaning, or as contended earlier that it has certain agreed upon definition. Booth (1991) argued that 'Security' means 'the absence of threats', and the examination of related questions becomes imperative. What defines the nature of threats, and from whom, is the first and foremost question that maybe posed. Next is the question about the collective and the individual, who have to be freed from threats, and lastly what means are opted for achieving the said security. Different worldviews lead to differing understanding of security in general. It must be understood that though we may think of survival and security as synonymous, they are truly distinct (Williams 2008).

Security studies as a broad spectrum, in a particular manner constitutes sets of practices, validates actors or constitutes political communities and their limits (Browning and McDonald 2011). The end of the cold war triggered ferment discussions about the nature of security. The period saw the emergence of a new era marked by peace and cooperation that found a base in liberal democracies, global capitalism, international organizations etc (Kaysen 1990). Contemporary debates have been floated around unravelling the nature of security, and to whom it applies. Security, undoubtedly is political in nature, as it plays a vital role in determining 'who gets what, when, and how in world politics' (Lasswell 1936). Resource allocation has been a struggle in states where security receives major chunks of investment and priority. Security can be considered as a political tool, for laying claims to receive priority attention in a competitive fold from the government, while arousing among the population a consciousness related to important issues (Buzan 1991: 370). It concerns itself with real people with real concerns, and therefore it cannot be restrained to being categorized as an intellectual pursuit alone. There has been a significant push for rethinking security since the end of the cold war. Different debates mushroomed, that laid stress on

updating or broadening the concept, including 'securitization', 'desecuritization', future security agendas and methodological issues for studying security (Mathews 1990). Rethinking would not mean purely adding issues to security agenda, but making it capable of identifying and opening up to all those issues which engender insecurity, preventing freedom of individual choices, a major focus under critical theory. The practice of security studies is marred with lurking divergences today, as it poses various questions with differing scopes and outcomes. These contradictory themes thus, lack a complementary cohesive framework for analysis. To be able to direct security studies so that it can interpolate post-cold war, non-traditional threats, more efforts are needed than just the mere recognition of these emergent threats. The expansion of the field has called for its affirmation as an independent discipline within International Relations.

In furtherance of the broadening and deepening agenda, sources of newer forms of security threats have been identified ever since the close of the cold war. These threats do not necessarily concern state security alone, but spill into areas that have an impact of the security of the individual, as well as the community. Technology and its various artefacts have been an important addition in the list of these sources, while they are primarily intended to improve human well-being. To look at it reflexively, is the need of the hour from the prism of the various theoretical schools of security studies.

3.2 REALISM:

A dominant theory of IR, realism propounds that the international system has been constantly shaped by the state of war. The theory traces back its origin to the eighteenth century, influenced by the works of Thomas Hobbes and Niccolo Machiavelli, placing human selfishness as a key factor in their theories, which also occupy a central position in realism. The history of realism begins during the First World War period, where deliberations regarding the cause of war was initiated among the idealists, in order to find a remedy for the same. The collapse of cooperation processes after the war helped it gain a dominant position. The starting premise of realism is that, states as a political unit are primary actors inherently inclined towards a fixed and pre-determined self-interest, which is concentrated on the accretion of power, largely in terms of military capability that leads to concerns of security that are potentially harmful to each other in this context (Smith

2015). Intentions of other states cannot be known, and largely are driven by the notion of survival. In this respect, they act as rational instruments and locate strategically, means to survive. Hans Morgenthau represents the classical realist strand and remains for many scholars over the years, a reliable source to unearth the realist domain of international politics. According to Morgenthau (1948), international politics is ‘...governed by objective laws that have their roots in human nature.’ He states that inter-state relations define the realm of international politics where foreign policy must be observed closely, to gain insight into the dynamics governing this sphere.

Neo-realism or structural realism successfully overtook classical realism and came to influence the subject even more. They, on the other hand, state that the international realm is anarchic. They however, separate themselves from the stance of the classical realists, in that they are of the view that the structure of anarchy, within which the states exists is so due to the absence of an overarching sovereign authority (Waltz 1979). The views of this school expound the lack of a governing body, and perceived malevolent players in world politics explaining the endemic conflict observed (Donnelly 2005). Kenneth Waltz is the proponent of structural realism, in which he criticises Morgenthau’s classical realist approach, that it confuses the two problems of foreign policy explanation and development of an international political theory. He further goes on to reject the notion that power may be considered as an end in itself. He argues that ultimately states strive for security in place of power. According to Waltz (1979), the twin facts of life under anarchic conditions, one that the state to provide for its own security, and the other that various threats abound, lead to conflict among states. The way of life is defined by a constant engagement in identifying threats and dangers, and designing strategies to counter them. This creates a tense atmosphere, marked by hostility and suspicion, whether the states may or not give into it. All states are actively driven by ensuring all possible safeguards, to ensure their individual security and this end up in an arms race and alliances. Thus, the belief among neo-realists concerning the uniform self-driving nature among states to fulfil its own interests, is due to the absence of authority over and above them. However, while dealing with the non-traditional security aspects, neo-realists appear to be reserved. The central theme under the neo-realist framework seems to circle around state security alone. In the post-Cold war events, neo-realists seem to have taken to rethinking certain assumptions treated as

convictions earlier. While the mainstream has been occupied with discourses of environment, political rights, economic concerns, human rights, realists would rather be wary of granting them a status at the ranks of state security.

The uncertainty about alliance choices and their nature, and intentions, as also the relations between various powers over long decades, is what made the cold war era appear different from earlier eras in world history. The success of structural realists in explaining and capturing this fact gained them the immense popularity (Wohlforth 1995). Yet the relevance of the traditional approaches of the cold war era came under questioning. Whether it was plausible for an approach based on a rigid referent object and premises, be able to establish for itself, a place in the globalised world has generally been an unanswered question. With the emergence of newer dimensions of security, as propounded by the critical approach, concentration is on issues that cropped up at the end of the cold war and captivated global attention. Realist theories cannot however be invalidated by this transformation. The relevance has to now be measured in terms of extent. With the collapse of the bipolar world, the conventional knowledge of security was removed. The focus has largely shifted towards analysis of power politics, where the Neorealist strand has the potential to offer insights into bilateral relationships in the contemporary world (Smith 2008). The study of realism in international relations must be therefore viewed as a study of *insecurity* among sovereign states, going by the anarchy that the system is believed to have. While the bipolar world influenced by nuclear rivalry confirmed to the Realist perception, which accepts inter-state conflict as a permanent feature of the international system, it still defines security in narrowest terms limited to militarist threats to state sovereignty.

Though, the concern of war among states in world politics remains a potent probability and challenge, it cannot be ignored altogether, and there have emerged newer state interests, and understanding of national security has been defined in ways that go beyond the 'balance of power' concept propounded by realism (Slaughter 1995). The growing state interests coupled with the inclination leaning towards greater democracy is an argument that the relative influence of systems and domestic factors, in shaping and pressuring international relation is becoming predominant. Realists held on to the stiff resistance

against the dual processes of ‘broadening’ and ‘deepening’ security, as it is felt that the study of security in the international system could be in danger of losing its theoretical coherence in the attempt to redefine it and include many non-state and non-military concerns (Walt 1991). Hence, realists argue that their narrow state-centric security, where power is expressed solely in military capabilities, ‘continues to explain world politics as it is, not as it should be’ (Smith 2008).

3.3 LIBERALISM:

As a political concept, liberalism inter-relates to the autonomy of the individual and encouragement for democracy. Drawing from a rich intellectual tradition going back to the most influential Immanuel Kant’s ‘Liberal Peace Theory’ articulated in his essay ‘On Liberalism’, presents itself as the other most important wing of traditional thought. In ‘Perpetual Peace’ Kant put forward the simple, yet an essentially intense proposition that states with constitutional republican systems were less prone to arouse interstate conflict. He further reasons that the adverse impacts of military warfare and conflict is most felt by the civilian population, who practically have no control over the state’s decision. If an opportunity is provided to them to actively participate in the political process, they would be successful constraining elements on their country’s decision-makers. A republican government brings in accountability of leaders to a conflict stricken masses and therefore, popularly elected governments would be more pacific in nature vis-à-vis absolute monarchies or autocratic governments. Liberalist approach of security studies reached its zenith in the post-First World War period, and it received political guidance of Woodrow Wilson (Morgan 2010).

Like the realists, the scholarly admission of the theory that the international system is delineated by anarchy, and the resultant inter-state conflict arises in the absence of regulation. For liberals, however, unlike suggested by Realist tradition, interstate conflict remains a possibility but is not an ‘inevitability’, and the liberal strands to security are therefore guided by exploring explanations or interpretations to minimise the likelihood of inter-state conflict (Smith 2015). It approaches the questions of security in heterogeneous ways through its various strands. Like any other major approach, looking at liberalism as a single uniform approach will be wrong. It is a stage for competing claims and

encompasses divergent theoretical assumptions when addressing the international security question, each strand having its own proposed solutions and means of dealing with interstate conflict within the international order. It identifies the state as the primary object of analysis and that military conflict is the primary source of insecurity. Robert Keohane, and Joseph Nye emphasize essentiality of other actors such as non-governmental organizations, interest groups, multinational corporations, international organizations as well as political parties and elites as domestic actors in the international arena (Morgan 2010).

An important division between the traditionalists, concern what John Herz (1950) calls the 'security dilemma.' This term refers to the attempts by one state to secure its needs, though in a peaceful manner, creating rising insecurities for other states and giving birth to structural problems (Herz 1950). It appears in situations where difficulty arises in distinguishing between offensive and defensive behaviour of states. This concept for liberals, is more a result of perception than outcome of reality, which occurs because the intentions of rival states often are misperceived, mistaking the defensive intentions of a rival for offensive behaviour (Buzan and Hansen 2009: 33). Neoliberals suggest introducing mechanisms of improved communication and transparency between states, in order to thwart this problem. For neoliberals, finding the answer to minimising interstate conflicts that are escalated by often occurring misperceptions, is the use of international institutions and agreements (Smith 2008). Neoliberals assert that the reference to the term 'anarchy' as used by neorealists is poorly defined, while themselves offering simplistic interpretations, should not be an evidence that the international system is deterministically consumed by interstate conflict (Milner 1993: 68). It is therefore, the fundamental aim for neoliberals is to dispute the claims of the neorealist theory, in which states are projected to be trapped in a permanent structure of interstate conflict. At the same time, there is an acceptance that doubt and uncertainty are prevalent in an anarchic system, where any cooperation among states is threatened by an overarching enforcement institution that could subside their insecurities. With this concern ever rampant, neoliberals lay their claims on the power and influence of international institutions, as effective agencies for reducing state pressure in an anarchic system. Such institutions can facilitate the states to find a way out of the consequences of structural anarchy 'on their own security needs' by creating mechanisms for communication and transparency through establishing

multilateral agreements, arranging mutual military inspections, facilitating arms control programmes, and establishing international regimes (Smith 2008).

The liberal tradition is rather optimistic, with respect to the stress laid on the possibility of change and progress in their approach to security. This optimism remains steadfast despite their confirmation to the notion that there will always be a certain degree of interstate conflict in the international system. The end of Cold war saw the coming of the unipolar world, as opposed to the earlier bipolar world that had led to various issues rising on the security front. Realism came to be challenged from all corners, with its relevance questioned, leading to many changes in the constitution of the field of security studies. Though the newly emanating situation took liberal scholars by surprise, in certain respects they were able to adapt better with the new world order. They undertook the process of 'broadening' the scope of security, even under limited considerations, in terms of the economic dimension and reduced deterministic view of international anarchy which facilitated its survival in a changing environment. This enabled liberalism to propagate itself in better terms than realism, yet remained short of being adept, to prove its relevance, in a sense that not only explained the end of the Cold war but also its connection to a future order.

3.5 CONSTRUCTIVISM:

The debate in the early 1990s between the rationalists and reflectivists led to the introduction of constructivism (Keohane 1988). Nicholas Onuf introduced the actual label of constructivism to IR in 1989 (Onuf 1989). The English School and the Copenhagen School, contributed to the evolution of the approach considerably (Ulusoy 2003). Social constructivism and related theories perceive security in terms of an aspect of social reality and is thus, divested from laws of the material world (Mattola 2011). There exist sharp differences between constructivists, on the level of ontology, analysis and methodology. The difference between traditional and constructivist theories is based on the fundamental disagreement about the ontology of security, and how security can be studied. Conventional constructivism examines the domain of international politics by scrutinizing the role of norms and identity. Ontology as the study of beings, can be categorised into ranges of possibilities that are sought to explain issues in their full length. Similarly,

constructivism relies upon the ontological commitment that represents the pluralist-idealist ontology (Balzacq 2010). This reflects firstly, its perception of beings constituting world politics and secondly, concerns itself with the links between them.

Constructivism draws on sociological approaches and critical theory argues that intersubjective interactions result in the formation of the social. According to Wendt (1995) the social structure consists of three parts, namely: shared knowledge, material resources and practices. Social reality is mutually constituted by the interaction between agents and structures. It seems therefore not directly a theory of security or even International Relations. It is a broader social theory that provides a perspective to the study of security. Yet, constructivism is deemed to take the middle ground (Smith- Owen 2001). According to constructivists, the international system represents a set of ideas, a normative system, a body of thought which has been constituted by selective people in particular time and space (Jackson-Sorenson 2003). The advocates of this theory, claim to a comprehensive approach to the periods of structural change enabled by agents in world politics, especially at the end of the cold war (Kratochwil 1993; Wendt 1992). Conventional theory of constructivism lies between mainstream international relations and critical theory (Hopf 1998). Simply put, 'to construct something is an act which brings into being a subject or object that otherwise would not exist' (Fierke 2007). Though it does not imply here that security in this paradigm is devoid of meaning or has no quality of its own. But the ways in which it may be understood, stand as an insufficient measure to deconstruct related questions that emerge through its application, to arrive at substantial conclusions. For instance, it reveals little about the group itself, its core values and what threats these values may be facing, and what means can be deployed to advance or conserve these values. (McDonald 2002).

A contextual application and derivation of meaning, developed through social interaction between actors, outlines its approach. According to this, security comes into being through articulation and negotiation in specific social and historical context. Like other traditional theories, it suggests the possibility of portraying the external world, a world 'out there' to be discovered and objectively described. The assumption that non-material factors are central to the creation and practice of security in international relations is based upon the acceptance of the bearing of identity to security (Williams 2008).

Critical constructivists explore the identity-security relationship, by outlining the processes through which narratives of national identity become contextually dominant. This in turn, legitimizes the requisite and feasible political action. The said identity is an unfixed, contingent category, a site of constant competition (Williams 2008). The failure of the mainstream theories of neorealism and neoliberalism, to provide explanations for explaining the end of the Cold war and its consequent events, created more room for the growth of constructivism. As Wendt (1999) put it, constructivist theory saw its revival and acceleration after the end of the cold war period that exposed the shortcoming of most theorists, who made orthodox claims to explain the occurrences during the Cold war. The mainstream international relations theories found it difficult to fully elucidate the systemic change created by the cold war. Most mainstream theories have adopted the rational choice theory as their starting point. Assuming the international system as a single anarchy under which states are directed towards ensuring their survival, they have neglected the social feature of the system. Wendt's theory of constructivism, fills in the gap left by the mainstream traditional theories, and attributes human qualities to state actors and unveils the socially constructed aspect of these actors. The basic interjection made here, is that while power and interest remain driving forces for determining state action as always, 'their meaning and effects depend on actors' ideas' (Wendt 1999: 25).

Constructivism can be assumed to arrive at different interpretations of human security. With the emphasis on concepts and identity, constructivism and human security represent a new language, a new symbol and a new way of thinking about security studies and international relations (Tsai 2009). Moral and policy oriented obligations define the protection of human security, since it can be seen as a complex matrix of requirements for its protection. This matrix helps the growth of individual and social values, along with organizations, and develop collective questions to find an explanation (Ginkel and Newman 2000: 60). Constructivism, regardless, provides a useful theoretical perspective for accurately comprehending issues of as wide ranging as violence, class, gender and race (Conteh-Morgan 2005: 72-73).

3.4 CRITICAL THEORY:

Critical security studies represents the trends emerged since the 1960s. The underlying concept that hold critical theory is the acceptance that knowledge derived theoretically about the world, is not objective but has normative implications with political outcomes. 'Indeed, critical approaches seek to identify and challenge the function of knowledge produced in problem-solving theories' (Heath-Kelly 2010; Reus-Smit 2008). The application of such an understanding of what is 'critical', to the study of security, is when the socially constructed feature of security is accentuated. This sets to be a major criticism of traditional approaches, in that it questions the very basis of the nature of security, as being a study of the threat and use of force by states. The critical approach typifies the inherent normative proclivity in such choices and the consequential political ramifications.

Critical theories thus do not relish on a perspective of a great past, but believe in reorganizing and fundamentally transforming the present so that future systems do not ascribe to the present forms of oppressions. Primarily aimed at achieving this aim, the focus on emancipation, critical theory can be termed as a progressive approach. Critical security studies is inspired by the works of Ken Booth and Wyn Jones, and is defined through the Frankfurt School. Conceptually, critical security studies argued that 'individual humans are the ultimate referent' for security, as states are unreliable providers of security and too diverse to provide for 'a comprehensive theory of security' (Booth 1991). On the other hand, critical security studies place the experience of men and women, and groups at the centre of its agenda, for whom the 'world order is a cause of insecurity rather than security' (Jones 1995). This is done, in order to clearly underline the privilege conferred to states to set right the goals of means and ends. Therefore, while the traditional theories privilege power, critical theory of security privileges emancipation. 'Gangster' states become an additional concern for security, who restrict the rights of their own citizens and become a source of insecurity (Wheeler 1996). Emancipation means providing freedom to people and communities, or groups, from the constraints of social, physical, economic, political factors that inhibit them from choosing and performing as they would as free individuals (Booth 1991). When people are emancipated, they choose to do what is peaceful. In these terms individual security is deeply intertwined with collective or global security. One of

the attractions of the critical turn in security studies is that it should never settle into the complacency of that it seeks to overthrow; the essence of a critical approach is that it expects change (Booth, 1997). The ultimate goal of critical theory is thus, emancipation of humans from the various false consciousnesses that arise out of certain orthodox concepts. 'False consciousness' being the condition whereby human agents 'falsely objectify their own activity' (Geuss 1981). Critical security studies is thus differentiated from other critical approaches based on the interest in its emancipatory narrative (Bilgin 1998; Booth and Jones 1998). Der Derian (2008), for instance, stresses the impossibility of being 'secure', calling for a strategy to 'celebrate' the anxiety and insecurity of the contemporary world. Ole Wæver (1995), questions the usefulness of a broader security agenda, making a case for 'desecuritization' instead. The development of peace studies in the 1980s was focused on initiating new thinking about the cold war situation. Broadly, it is seen as a point of critical turn in international studies. Critical security studies is as broad in its pursuits as to include a range of approaches drawing upon theories and analyses from Marxism, feminism, constructivism, post-structuralism etc (Krause and Williams 1997). While focusing on military issues, peace studies envisaged other considerations like economic upliftment, environmental stability, education etc. It ushered in a broader perspective which has played an influential role in the ripening of critical security studies. This concept is generally known as the broadening of security agenda. The consideration given to the alternative threats that remained occluded during the Cold war, first augmented by Buzan (1983), became the core formulation of the broadening agenda, where in his very influential work, 'People, States and Fear', he argued that the military security of a state was not the only feature, and that states would do better if they can factor threats to their society and the environment, political systems and economic resources. Robert Cox's (1981) dual category of world politics is divided as the traditionalist problem solving theory and reflexive critical theory, under which the former assumes that the problem of war between states needs to be 'solved', and the latter makes a critical analysis of this presumption. Critical theory, hence unfolded as a political enterprise to question and analyse the conception of traditionally understood security toward evolving an intellectual practice to problematise the emerging debates. In practice it's implication is aimed at the

empowerment of marginalised voices that speak for the grievances caused by the existing order (Jones 1999).

The Welsh School came up at the forefront in its attempt to redefine security and Andrew Linklater can be considered as the most important scholar of this school of thought. While accepting the view propounded by the Copenhagen School, that threats of security are social constructions, they also advocate that both threats, and security objects are constructs (Mutimer 2016: 95). For the proponents of this school, security carries a decisive normative value. A critical analysis of security, in this case, is a political and normative concern. It follows the Marxist tradition, in which it argues that history and reality do not occur in an objective sphere, but as a realization of human action. Simultaneously, critical theory argues that knowledge arises from reflecting pre-existing social purposes and interests, and not the subject's neutral engagement with an objective reality, denying the separation between fact and value. The perception or consideration of what is true and real is then a reflection of 'particular interest of a particular actor' (Cox 1981; Linklater 1996). Knowledge is produced through social interaction and it produces and reproduces reality, and in this manner knowledge is by nature political and cannot be divested from it. Security in this realm is understood through a security-politics nexus. It prevails as a derivative concept, due to its prior dependence upon the perception of the political, implying that it is linked with a set of desirable political ends (Nunes 2018).

Critical theory as a lens to look at security, has not come clean of criticism and secured the idea of emancipation in an unproblematic way. The various accusations levelled against this approach begin with the assessment that there is an unhelpful distinction between individual and society (Shaw 1993; Riesen 1998). The other major concern cited in varying degrees of intensity, is the assumption that the universal applicability of emancipation theory contradicts its origins in a particular (Western) tradition². Claudia Aradau (2004), has more recently argued that it is not the concept of emancipation itself that is problematic, but the manner in which it has been defined and used. As Aradau (2004) notes, security is embedded with certain repressive and exclusionary practices that are

² See Hayward Alker, 'Emancipation in the Critical security studies Project' and Nicholas J. Rengger 'Negative Dialectic? The Two Modes of Critical Theory in World Politics', in Richard Wyn Jones (ed.), *Critical Theory and World Politics* (Boulder: Lynne Rienner, 2001)

accompanied with militarisation and securitisation, and hence, when emancipation is read in the context of security, a precarious problem arises, as emancipation outside the security logic cannot lead to social transformations. The struggle for security is revamped into the struggle for emancipation without analysing the relationship between the two (Peoples 2011). In that, Aradau (2011) argues, that this 'circular definition' of emancipation in terms of security belies the former of its 'transformatory potential'. Mark Neocleous (2008) follows by questioning the nature of the logic of security and its association with emancipation or freedom as its core principle, which might in reality be a remodelling of society envisioned in a particular order. Against Ken Booth's (1991) famous identification of security and emancipation as 'two sides of the same coin', Neocleous (2008) argues that it is 'security and oppression [that] are two sides of the same coin'.

Critical studies requires one, to look at and reflect on a host of security issues to understand how it creates various forms of insecurities and seclusion in a globally anxious world. While keeping emancipation as a goal, the approach should reconsider various premises upon which emancipation is based and widen its scope to include the reflections of various critical theory scholars from differing disciplines. For instance, Foucault suggests that the notions of emancipation or liberation must be prioritised by the concept of resistance. As Pieterse (1992) states, Foucault does not rely on transcendence theories but on what exists in discourse alteration, meaning different truths and power at different times. Struggle may actually result in a new form of domination. He therefore prioritises resistance over emancipation or liberation discourse, as there is little scope for emancipation to emerge out of a nexus between truth and power and not causing any radical social transformation. Aradu (2011) argues against this, for recognition of emancipation as a central concept and that the radical implications of this concept, must be fully realized with regards to equality and democratic participation, and that the equation of security and emancipation ultimately constrains this potential.

3.6 FEMINISM:

As a critical approach to security it argues for a broader definition of security, in that it is able to fathom considerations of women's experiences and perceptions in the context of security. In its broadest form, it demands extension of the idea of security to include a range

of issues like violence, economic deprivation, environmental hazards, food shortages etc. It basically questions the gendered nature of the concept of security itself. To fully grasp this idea, it is imperative to firstly understand the feminist perspective in relation to the study of security in International Relations. The idealized notions associated with women in security context is the common perception that women are either victims or in need of protection.

With feminists beginning to engage with global politics, the thought was met with ridicule or hostility. As Whitworth (2008) expressed this contention by stating that feminist theory that concerns itself solely with the activities of women, could in what way explain the working of world politics, military, deterrence, decision-making processes. Feminism is grounded in the everyday life. It draws the conceptions of inequality and discrimination not from some external, objective reality out there, rather builds through everyday observations of these phenomena. Feminism is described in waves of women's movement, each one representing the push for demands considered essential for the upliftment, empowerment and dignity of women as equal citizens of the modern state. It ranged from issues of political inclusion to social equality. After a phase of a low dip on the political horizon, it refurbished again in the late twentieth century. As a theory it is neither passive nor complete (Smith 2008). Despite different versions of Feminism, all share the common understanding that societies across are unequal based on practices of discrimination against women. This perception of gender inequality has wide ranging expressions in women's movements.

'Nowhere is the silence towards gender more deafening than in the field of International Security' (Wadley 2010). The presentation of international security as gender-neutral has dominated the discourse of security, that makes gender-differentiated understanding of security difficult to fathom its impact on men and women. For feminists, gender neutrality is a myth as, 'gender is a socially imposed and internalized lens through which individuals perceive and respond to the world' (Peterson 1992). While discerning how gender impacts or permeates international security, the feminist scholars have relied upon various theoretical frameworks, each providing different perspectives. It identified intersubjectivity as a major component that remained unexplored for long, and therefore

oversimplified the problems of inequality and dominance. Gender thus, expresses the power hierarchy which comes as a vital interjection to a field that functions on the assumption of 'undifferentiated political actors' (Stokes: 2015).

There was a strong belief among the scholarship that when issues of women are brought to the front and combined with other theories, the outcome is very different. In such, it was evident that international relations theory was in fact, extremely slow in adopting feminism in its fold. All along, it remained dominated by men at different levels of practice and research. In their view, international relations was thought of as a world of interaction between states in conflict and their resolution. Larger politics was seen as a domain where other considerations of people, race, sex were invisible (Stokes 2015). International Relations are based on natural science considerations: Theory building in conventional international relations dominated by realists, aims at generating propositions about security oriented states that can be tested and explained. (Tickner: 2004). Feminist theory, on the other hand, is explicitly normative by nature and harps on emancipation as a core value. Feminists seek to develop knowledge that reflects the everyday practices of reality which must question the claims of objectivity and universality, based upon knowledge about men. Feminists while believing in a bottom-up approach, also claim that the theory is an essential wing of politics (Tickner 2004).

International relations as was, always focused upon the concepts of the state, international organizations and international events, people and individual experiences hardly came to be considered as referent objects. Only with the maturity of the discipline did the attempt to broaden the horizon of security come, to encompass the happenings of the world in more depth. It was also felt necessary to study and consider other marginalized concepts that, form the underpinning of the larger world politics that it included. Enloe (1989) said that the ties between states did not only depend on 'capital and weaponry' but also on the 'control of women as symbols, consumers, workers and emotional comforters'. Tickner (1992) has pointed out to the lack of attention that has been given to gender as a category of analysis, and states further that a feminist, or non-gendered, conception of security is defined as: 'the absence of violence whether it be military, economic or sexual'. Like its associated critical theories, feminist too, advocates that ensuring only the elimination of

conflict between states, is an insufficient condition for security. It becomes imperative to look at security but from a divorced perspective to daily life, in which it finds itself entwined with rights and freedoms of individuals. This leads security to encompass protection from violence in different time and space, issues of access and freedoms to take individual personal decisions 'as well as rather more remote considerations of national defence' (Stokes 2008). Armed conflicts in feminist accounts are expressed not only in terms of impact on women of war conditions, the focus is also laid upon ways in which women are themselves actors in armed conflict (Whitworth 2008). All in all, feminist accounts direct our concerns, and broaden its opening, to perceive different set of practices, that traditional approaches contending security as a gender-neutral paradigm, cannot appreciate.

3.7 CONCLUSION:

From the above discussion, we get a brief overview of some of the different approaches to security that have contributed to its development. Each one relies on diverse perspectives to study the meaning of security, employ different methodologies, study varying aspects and focus on multiple dimensions of world politics that influences security. Each approach while having its criticisms, has undoubtedly widened the horizon of the ways in which one can look at security. It enables the study of its evolution in order to answer questions emerging from different arenas of various disciplines.

Post-Cold War, the frequency of its use, it came to be associated with a hoard of other events and phenomena, which also increased its ambiguity. The 1980s saw raging debates over the methodological theoretical premises and uses of the enterprise (Holsti 1985). As it has been seen, this association of security with other emergent concepts was seen by some, especially the traditional theorists as the erosion of the conceptual base of security by including everything under its ambit. There were still other who encouraged this process in order to re-evaluate security and give it relevance and a continued meaning. This flexibility attached to the meaning of security becomes essential for its assessment, in order to rearticulate it from a present-day lens.

The starting point of security has been the ever-prevailing question of 'whose security?'. With the advent of the nuclear age, the question of state provided security came to be highly

questioned. With nuclear capability having moved into its advancement, with many states acquiring nuclear capability, has stressed on this question furthermore, as a nuclear war has rendered us insecure like never before. The idea that security is coercive and imposed, highlights the power relationship of security and thus can critically interrogate the premise of ‘whose security?’

Modern states with modern problems have encouraged people seeking justice and freedom within the state, which has increased political involvement. People have come to act as influencing agents in the decision making of the state and thus, the security apparatus needs to respond to these aspirations. It has become unsatisfactory thus, to see security narrowly in the context of military or national security domain. The post-cold war world has been marked by the developments of globalisation and information revolution. Thus, an awareness of the realities of globalisation plays a key role in decision making for security. Security threats from the wide spread generation and usage of large scale data begins around the same period as well. The literature that has been fleshed out here, is hence used to produce a security framework that can fully capture the phenomenon of Big Data and its potential. We shall hence look at the various ways in which the security discourse can grasp Big Data, for both the ‘broadening and deepening’ agenda and the ability of Big Data to act as a tool for social transformation in Chapter 4.

CHAPTER 4

BIG DATA AND THE SECURITY NARRATIVE

The analysis of emerging Big Data practices and their varied and often confusing impact on existing modes of knowledge creation was dealt with in Chapter 2. Whereas, the explication of security perspectives, through the lens of different theoretical schools of thought, was carried out in Chapter 3. This chapter tries to explore a slightly ambitious and understudied aspect of security that researchers are increasingly looking at, in the crossroads of digital technology and the ever existing quest for security. It has also been thought out as an interdisciplinary attempt, to live up to the spirit of looking at ‘the cutting up of social reality’ for practical purposes that confluences into knowledge, represented by a ‘larger whole’ (Cox 1981).

This winding path, starting from the explication of the concept of Big Data and a study of the various theoretical schools looking at security, from multiple vantage points can be expanded further. Here Big Data matters more and even more so in the future, as something that profoundly influence notions of security. Different schools have evoked varied reactions on the question of technological evolution from the beginning of industrial warfare in the early twentieth century to the emergence of nuclear, chemical and biological weapons in the mid to late twentieth century. Since the end of the cold war, the visible change in the nature of threats emanating from different sources, called for a change in the approach to security studies. The move away from military threats to a much more broad-based scenario of threats is the most significant change of the period. (Baldwin 1996: 118). This gave rise to the broadening and deepening agenda in security studies and international relations that sought to incorporate newer sources of threat, which were not only state-centric but also included the security threat of the community and the individual.

The rise of the internet along with the invention of vast data producing capabilities of the allied ecosystem is a phenomenon of the twenty first century. This is widely called as Big Data in the computational or data science community and is slowly being recognized for

its social role. Not much work on the security aspects of this phenomenon are found other than from the perspective of the Paris school of security studies. It can be said that the mainstream schools of international relations look at Big Data largely as an extension of its ‘problem-solving’ capabilities, and the reflexivist schools which include the critical theorists are not really concerned about the ‘epistemological and ontological’ claims that underpin Big Data than their focus towards ‘civil liberties, privacy, etc’ (Chandler 2015). This is a major limitation when it comes to looking at Big Data through the security angle for the simple reason that it is still largely viewed through an instrumental logic rather than inquiring into its power of constituting knowledge itself.

It is with that limitation in mind that this chapter is put in way that they cover the broadest possible social relevance of Big Data and specific locations within the security discourse that are ripe for further exploration. Initially, Big Data and very naturally the cyber sphere are looked through the lens of the ‘three images’ (Waltz 1959) and then a possible ‘fourth image’ (Choucri 2012) that is considered at the global level. It is important to note here that the phenomenon of Big Data is constituted in such a manner that has important implications on all four levels, either by design or chance.

There is also a need to look at Big Data and the field of Data Studies from a normative angle, over its potential to act as an agent of social transformation. While there is already a definite idea from Chapter 2 that Big Data has the potential to engender very significant social change, we are still at a loss of mapping how effectively it can be deployed for emancipatory purposes. This chapter would primarily make an attempt to engage with these questions and also try to emphasise on a greater need for the security narrative to explore it further.

4.1 BIG DATA AND THE FOUR IMAGES:

According to the mainstream of security studies, a very useful way to gauge the impact of Big Data and its applications is through the conceptual framework of the ‘three images’ as given by Kenneth Waltz, the founding proponent of neorealism. Waltz (1959) is primarily

concerned about the understanding of war between ‘groups of people’ who were ‘devoid of any central authority’, and tries to formulate a framework that helps in his study. The three images or the levels of analysis employs western political thought for explaining the vagaries of the international system through the first image (man), second image (state), and third image (international system). These levels clearly demarcate different units of reference through which one can observe change in the international domain.

First Image- The nature of man and his selfishness along with his ‘aggressive behaviour’ to fulfil it constitutes the first image, where the tensions at the level of international system is primarily because of this (Waltz 1959: 16). This can be remedied only through an attempt at the reformation of man and changing him. Choucri (2012) notes that the first image is no longer ‘contained within the state’ when it comes to the cyberspace and have started to acquire ‘dimensions of its own’. This holds significant insights for Big Data, as much of it constitutes the personal data of people that are collected in real-time. The systems designed for their collection are made in such a way that people voluntarily share their information in exchange for a variety of services.

Security concerns that emanate from the first image or at the level of the individual is perhaps the one that has received the least attention. While the powerful concept of privacy is identified as a medium to address concerns of data collection and reuse, its meaning and utility have went through great change in recent times. For concerns of human security that try to prevent individuals from various kinds of threat, we are still at a very early stage to conclude how Big Data could impact them. But it is definitely true that as much as we do not engage with Big Data critically, the possibility of it turning into a security nightmare are ever present.

Second Image- States and their nature form the bedrock of the second image, where their ‘internal structure’ plays the most vital role in both the shaping of the international system and in the study of war (Waltz 1959: 80). The state system and its inner logic works in accordance to the variables that influence them from the inside such as resources (human and natural) and technological capability (Choucri 2012). While the state is usually

considered to be a late entrant in cyberspace, which had been and is still dominated by large companies of the private sector, it has become a new medium of conflict and competition. Big Data on one hand increases the capabilities of the state for both good and bad, from activities like harvesting the data of its citizens. At the same time Big Data acts as a spot of vulnerability for the state as it does not hold monopoly over every kind of use of information as non-state actors of every kind dot the cyber landscape.

Third Image- The overarching state of existence in the international system is anarchic ‘without the presence of any central authority’ according to Waltz (1959) and this endemic condition leads to wars or tensions between states. Big Data similarly has an impact that cuts across disciplines and activities that it has been observed to create disruptive effects. Though it can now be inferred that the pervasiveness of Big Data is something that is here to stay just like the ‘condition of anarchy’ that is ever present.

The fourth image is that which covers the entire world in a comprehensive manner which is described as--

‘the global system is the overarching socio-environmental ecosystem and forms the broad playing field for human decision making and activities — transcending all jurisdictions, markets, and delineations. A large number of institutions and entities, not just the sovereign state, are active organized decision makers in this arena’ (Choucri 2012: 175).

The conceptualisation of the global system as an all-encompassing level which is dynamic in the roles of the actors in it, is a particularly significant. It brings back the question of ‘security for whom’, ‘Security for whom?’, ‘Security for which values?’, ‘How much security’, ‘From what threats?’, ‘By what means?’, ‘At what cost?’, and ‘In what time period?’ (Baldwin 1997). The reformulation of the security concept for such a different and dynamic environment is still in its infancy. The tendency to assume Big Data as purely a technical phenomenon shorn of its societal impact is partly responsible for this.

Addressing it in its full length, while is a much more complex endeavour, we can still parse out specific interactions for deeper analysis.

4.2 SURVEILLANCE AND BIG DATA:

Surveillance has come to mean various things ever since the advent of the modern society because of the continuous changes in the forms of surveillance and the tools that are being used for the purpose. This has taken a particularly sharp turn in the twenty first century because of the immense power with which computers and networks continue to grow and their dynamism in a real-time environment. It is in such a context that the concept of dataveillance takes shape, which is seen to be different and complex from any other kind of traditional tool (Clarke 1988). Dataveillance can be explained as something that-

“do not require a centralized system, provided a set of different databases are networked and provided that they share the same means of establishing individual identification, so that a single unit (an individual or number) can be identified consistently across a range of data sets with a primary key” (Raley 2013)

Unlike traditional forms of surveillance, here it happens with the consent of the user of a particular digital artefact that includes the use and reuse of the given data for an unlimited period of time, with which even ‘social relations are established and collective entities established’ (Raley 2013).

Since a Big Data influenced environment is now an unavoidable reality, there is a need rather to adapt to it than resist it. As much as the idea of humans being away from decision making systems is a scary possibility of the future, we need to temper this fear and look at measures to counter this. Evolving practices to study a heterogeneous phenomenon like Big Data and the political subjects it constitutes, and the governance forms it engender, gain vitality for the purpose of having a sustained research program (Madsen. et al. 2016).

4.3 CRITICAL DATA STUDIES

Critical data studies is an attempt, rather nascent to study the generation, curation and other aspects of data that comes to exert power on all aspects of life. Since big data is always shaped by a contested ideological landscape in its creation and analysis, a critique of its instrumental nature will miss out an understanding of its epistemological effect (Thatcher and Dalton 2014). Wide ranging processes and methodologies are involved in the generation of data. Gitelman (2013) has described it well when they say that ‘raw data is an oxymoron’; ‘data are always already cooked.’ It is clear through this that databases are not a neutral or technical means of gathering and sharing data, but are a complex socio-technical system (Ruppert 2012), situated within a larger framework of relational processes and contingencies. They are manifestations of power that shapes discourses and policies influencing questions that can be asked and who can raise them. It contributes in carrying out various functions: as a means of enhancing productivity, efficiency, competitiveness, accountability in society, at the same time also leading to discrimination and exploitation of people. With improvements in technologies and changes in power regimes, more elaborate set of ethical questions are raised.

Critical theory perspective to data therefore, contextualises data and questions the proposition of it being neutral, objective, independent but are socially and culturally located and are outcomes of contingent claims. The modern obsession with quantification and technology today, data is seen to model what constitutes reality. This quantification-model of reality however, when produced or interpreted obfuscates the underlying understanding of the world and its realities. Data does not come from a vacuum or is not generated on its own. Data generation is undertaken so as to fulfil certain aims and goals and shape the ways in which this vision is achieved. It can take many forms and give rise to processes that involve various aspects of life and exclude some which reflect upon the nature of its use. From the gathering of data to its interpretation thus, involves meaning production and cannot be looked at as a simple representation of events. Events have meanings and emerge out of the interactions that exist in society and its various aspects. In

this regard, it gives one a lens to look at people in particular ways and make sense of their conditions and inform discourses and narratives. Datasets are therefore, inherently biased.

The aim of critical data studies is one to address the social data problems by identifying them and providing solutions for the same. The practical application of critical data studies has been identified with geography and in it, especially cartography. Since digital information crosses the boundaries of space, geography as a dataset of maps have long represented the various historical processes and relationships across spaces. Counter-mapping and indigenous mapping are critical applications of data whereby the predominant power effects can be challenged. Geographers have been utilising data and have experience in analysis for over decades. With the application of critical approaches, they have developed qualitative GIS, spatial analysis, counter mapping and so on. They have the knowledge and expertise to analyse complex spatial data. The in-depth analysis of 'space and place in big data' can be undertaken by them (Crampton et al. 2013). Geography as a field has made use of mixed methods and broad ranging approaches from qualitative to quantitative to understand phenomena. Critical data studies can be incorporated similarly to expand the reach to other sub fields like digital humanities and critical information studies (Vaidhyanathan 2006). These applications of critical data studies require a conscious effort and understanding how this incorporation will impact the field. Data needs to be historically situated and its application considerations must keep the critical questions in mind.

CHAPTER 5

CONCLUSION

The task of studying a technical phenomenon for its social implications is a challenging task in itself. Nonetheless, the idea of Big Data is too important to ignore, as it is set to challenge many fundamental notions attached to knowledge creation. The question as to how does Big Data becomes relevant in contemporary times, needs to be answered satisfactorily. To what extent is the phenomenon of Big Data particularly important for security studies is the main question posed. Studying the larger impact of Big Data is a complex endeavour yet there have been some substantial findings from this study.

Techno-optimism and associated positivist approaches to Big Data have dominated the field of data science ever since its inception. Since the conceptualisation of Big Data comes from the realm of computational scientists, it can be easily observed that its essence is still largely positivist in nature. Reconfiguring it for purposes of social analysis needs be done, along with revisiting key concepts that it claims to influence. The way in which induction is claimed to play a decisive role is emphasised greatly by various scholars. While one can safely assume that it does not mean the end of theory, Big Data practices could aid theory making activity with a much more empirical base. The other grand claim is that Big Data method would completely replace the method of sampling, which points yet again to assumptions that largely aid a problem-solving mind set. Prioritising of correlation over causation has been a major claim advanced by data scientists, which advocates a radical change of what to look for. In the opinion of a majority of social scientists, Big Data is not value free.

A necessary explication of security studies and its various theoretical school is then required for analysing Big Data's social characteristics in a security environment. Rationalist schools of security studies such as neorealism and neoliberalism, largely have their focus only towards the technical nature of Big Data, as a means of statecraft or a tool of economic efficiency. Reflectivist schools such as critical security studies do not

leave out the social aspect of reality. A feminist approach within the realm of critical security also helps in talking about the exclusion of gender as a construct.

The following are the inferences from the study of Big Data in the security discourse:

1. Big Data as a socio-technical phenomenon is found to aid the reinforcement of neorealist tendencies in the wider field of security. The continuation of hierarchies that were historically present, is even more visible even in Big Data conditions. One important reason behind this is the assumption that Big Data is a neutral tool that is helpful for purposes of instrumentality. The reflexivity to look beyond this is still an ongoing enterprise that may bear fruits only in the future.
2. The idea that Big Data is set to take away freedom and liberty is a fear that is grounded on legitimate grounds. As to whether this is fully possible, just like the portrayal in issues like surveillance from popular fiction is somewhat of a sketchy problem. Kitchin (2005) says that ‘identification codes’ that are employed in the collection of large scale Big Data as a feature of modernity leads to the rise of various unconnected ‘oligopticons’. These different datasets can be combined at any point in time to produce a massive ‘panopticon’ is the inference that he finds (Kitchin 2005). At the other end, the uses of Big Data have been identified to be particularly useful from the area of critical Geographic Information Systems (GIS) in producing alternate knowledge of mapping spaces and using them for purposes of positive social change. The idea of using open data for the purposes of ‘self-governing’ communities is a novel and potentially important application of social transformation in future (Chandler 2015). While the requisite data processing infrastructure, access or the expertise are absent today, it can have immense potential for a bottom-up approach of utilising Big Data.
3. Big Data and its impact on the concept of security and security studies are still woefully understudied except for works from the Paris school of security studies, which focuses on the surveillance and control aspects of security narratives. The

inadequacy primarily stems from the fact that epistemological and ontological underpinnings of Big Data are hardly researched upon over the problem-solving characteristics of Big Data (Chandler 2015). It is hence inferred that Big Data is important from the vantage points of security for the levels of individual and society.

A large number of big data uses fall under the regulatory grey zone. Underdeveloped regulatory systems, and lack of understanding and application of best practices, has caused most of the privacy and security issues. The formulation of policies regarding data management needs to address the preferences and welfare of the targeted audience and identify who these audience are. The impacts need to be continuously reassessed. For instance, the direction in which the current impacts is headed needs to be looked at in an integrated manner. The aspects where it is transforming economics, business and culture are discussed prominently; less debate has been observed about its possible implications for security. With the rise of predictive analysis, the possible applications of big data are seen to be impacting the security concerns more and hence, this aspect needs even more critical engagement.

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