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PDPU has been promoted by partnership of Government, industry and energy to create a world class University in energy education and research with special focus on the oil and gas sector. The university has further expanded its programs to address the need for trained human resource in the domains of engineering, management and humanities. It intends to broaden the opportunities for students and professionals to develop core subject knowledge which are duly complemented by leadership training interventions, thereby helping the students to make a mark in the global arena.

This objective is being further addressed through a number of specialized and well-planned undergraduate, post-graduate and doctoral programs as well as intensive research projects.

PDPU has been established by Gujarat Energy Resource Management Institute (GERMI) as a private university through the State Act enacted on 4 April 2007.

School of Liberal Studies (SLS)

PDPU has launched School of Liberal Studies which currently offers degree programs in UG, PG and Ph.D. that equips a student to develop an array of intellectual skills, a variety of methodologies and ways of understanding our changing world, and a broad base of varied knowledge. In turn, such a Liberal Education establishes an invaluable foundation for more specialized study in one's major or in one of the professions, and for a life-long affinity for learning and continuing intellectual development.

The course imparts classical education in various fields like art, literature, languages, music, dramatics, philosophy, politics, history, law, mathematics, science, business, commerce, communication and general studies. It emphasizes on the need to seek knowledge for promoting intellectual growth, creative expression and rational thought.

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Concept Note

Online disinformation, spread of deceptive messages, and making unsolicited and/or controversial comments with the intent to provoke an emotional, knee-jerk reaction to engage in arguments are pernicious. This has become global phenomenon. Not only sadist individuals resort to such acts, the political machinery in many countries make use of 'trolling' and 'fake news' dissemination to manufacture public consent or dissent on issues to further their parochial interests. Adrian Shahbaz, a Freedom House research manager, opines that "the unprecedented rise of state-sponsored manipulation and election meddling online was unique to 2017, and may prove much harder to fix than other ills", implying gradual institutionalization and political patronage of such tactics.

More importantly, the socio-political impact of such process is alarming. Internet trolling is damaging people, public issues, values of organizations, national economy, social fabric, etc. in numerous ways. The intentional insults and threats inflicted in organized way make it hard for the targeted person or organization. Sometimes attacks have real-world consequences, as when trolls get hold of the target's personal information. India has seen in the recent past spread of fake news on child kidnapping, cow slaughter, etc. A few months ago the Indian Foreign Minister Sushma Swaraj has been the subject of offensive tweet-trolling, following a passport row involving an interfaith couple. This comes after several years of sinister trolling of many opposition political activists, and woman journalists.

It is surprising that social media platforms do little, if anything, to stop the trolling phenomenon. For certain section find trolling and 'fake news' dissemination useful, the menace is here to stay and likely to get murkier. As noted by Oxford University Press, "Anyone with a laptop and an Internet connection can be in the news business". With so-called 'citizen journalists' on the rise and coming up of an attractive business model for spreading lies, is the world moving towards the dark age of journalism?

Liberal Studies journal invites three eminent scholars/experts to ponder over the issue of 'trolling' and 'fake news' and their implications. **Pradeep Mallik**, with his vast experience in the mainstream Indian media, argues that internet does not create special threats. It is the people in the public sphere who blurt things offensive. The approach should be to not throw the baby with bathwater. **Kriti Singh**, having background in media and communication, opines that the menace of trolls seems to be here to stay, but the answer is to not take the bait, and, rather choose discourses and online acquaintances wisely, self-monitor the social media networks and digital conversations, using strong privacy settings, and ultimately using the very technology being misused. **Binita Parikh** explains that fake news emerges not in vacuum; rather there are creators of 'fake news'. There are now people and organisations that exploit the gullibility of unsuspecting audiences by 'fake news'. Concern over this problem is now becoming universal with global proportions and ramifications. A new system of safeguards has now become necessary to combat this evil.

Of Jötnar-Gygjars and Hulderfork-Huldras: Just Look through the Trolls

Pradeep Mallik*

They are ugly, devilish, of gigantic proportion, sometimes tiny and with unusual features, perforce live in the dark, for exposure to sunlight will turn them into stone and make them lifeless. Little wonder, some creatures in the cyber world have been given the same name. There is more in common between the two pieces of species: creatures from Norse mythology called jötnar (singular: jötunn; feminine: gygjar) and some of the real life modern day homo sapiens sapiens who hide behind their computer screens and use gutter language on the internet.

Jötnar come out of dwellings in the mountain caves only under the safety of the darkness to prey upon human beings. So do the trolls; they venture out only in the cyber world, for being active in the real world will betray their spinelessness and give away their personality: that of being severely limited in civility and chivalry. Jötnar hunt humans as they are fond of human flesh; internet trolls assassinate characters simply because they don't have one!

What do jötnar do when they are not hungry? They throw stones at

* **The author** is Adjunct Professor and Head of the Department of Languages, Literature and Aesthetics at School of Liberal Studies, Pandit Deendayal Petroleum University (PDPU), Gujarat.

humans and destroy settlements in the mountains. And what do the internet trolls do? When they are empty in their head and have nothing of their own to say they blurt out something to make sure people don't forget their biggest quality: command of nuisance value or being circus clowns.

Then there are the Norwegian types – Hulderfolk. The internet trolls, like hulderfolk, are smart writers, but alas like hulderfolk they are unable to hide their long tails. Why, the tails are visible simply because hulderfolk-trolls move around in their birthday suit. These trolls try to conceal their tails in their undergarment, that is, when they try to pretend to possess some civility, their tails being tails, they simply give themselves away. Of course, there are female counterparts of hulderfolk: huldras. The latter have their own charm and sometimes ensnare even the most sensible of the netizens in no time.

In the late 1980s, Internet users adopted the word "troll" to denote someone who intentionally disturbs communities online. Earlier, the term used was "flaming". In the context of cyber world, 'troll' and its derivative like 'trolling' are recent entries to the dictionaries. Merriam-Webster defines troll as "a person who intentionally antagonizes others online by posting inflammatory, irrelevant, or offensive comments or other disruptive content."[1]

Urban Dictionary's top rated definition for trolling (verb), as it relates to the internet, is "the deliberate act (by a troll – noun or adjective) of making random unsolicited and/or controversial comments on various internet forums with the intent to provoke an emotional knee jerk reaction from unsuspecting readers to engage in a fight or argument."[2]

According to Wikipedia, a troll is "a person who starts quarrels or upsets people on the internet to distract and sow discord by posting inflammatory and digressive, extraneous, or off-topic messages in an online community (such as a newsgroup, forum, chat room, or blog) with the intent of provoking readers into displaying emotional responses and normalizing tangential discussion, whether for the troll's amusement or a specific gain."[3] Also, trolls often use profanities online (Moreau, 2018).

Supporters of trolling argue that it is about humour, mischief and freedom of speech. But for those at the receiving end, the ferocity and personal nature of the abuse mean plain defamation or hate speech (de Castella, and Brown, 2011). Today, the word has become a catchall for abominable online behaviour. "Trolling used be playful but annoying, a sort of virtual, comedic performance art with the end goal of getting under the skin of a selected online audience. Today the word is more often used to describe some of the most despicable

behaviors we see on the internet and social media apps, from stalking and harassment to violent threats and expressions of racism, homophobia and misogyny" (Halloway, 2016).

Happy Hunting Ground

A happy hunting ground for the trolls is the social media platforms but they go beyond these and sneak into the personal cyber domains like email and messengers of their victims. Advancement in science has given us Information Communication Technology (ICT), which, in turn, is a convergence of microelectronics, computing, telecommunications, broadcasting, and optoelectronics. The term refers to a range of internet-based and mobile services that allow users to participate in online exchanges, contribute content and join online communities.

Social media networks (SMNs) are a subset of ICT and defined as "online tools and utilities that allow communication of information online and participation and collaboration" (Newson, et al., 2008).

Often referred to as Web 2.0, the kinds of internet services which are commonly associated with social media are blogs, wikis, social bookmarking, social networking sites, status update services, virtual world content and media sharing sites (Dewing, 2012).

There is some overlap in the nature of the individual tools of social media. Blog is short form of weblog which can be hosted on websites like Wordpress, Blogspot, Weebly, Tumblr, etc; Wiki is a collective website where participants can create, edit and host content, the most prominent example being Wikipedia; bookmarking sites allow users to organize and share links to websites, examples being Reddit and Digg; social networking sites allow participants to constructed a public profile and also allow articulation of a list of participants with whom they are connected, the most popular being Facebook and Linkedin; status update services allow users microblogging so that they can tell others about their status or an event and follow such posts by fellow users; virtual world content sites offer game-like virtual environment for users to interact in, example being Second Life in which users create an "avatar" of themselves and interact with others through those avatars (OECD, 2007); media sharing sites enable users to post audio, video, photographs, etc, popular examples being YouTube, Instagram and Pinterest.

The enormity of social media tools can be understood by taking the example of the popular site called Facebook. Launched in 2004 as a social networking website exclusively for Harvard students, Facebook as of September 2018 has

more than 2.23 billion monthly active users which is a 17 per cent increase year over year (www.statista.com, 2018).[4] In other words, if facebookers were to be treated like a nation, then "facebook nation" will be larger than China and the US combined. Peoples of a few European countries will have to join them to outnumber the "facebookans". Facebook users interact with other users, or Facebook friends, by updating their status, writing on the walls of other members or sending direct personal messages. Users are able to create and join interest groups, "like" pages, import and search for contacts, and upload photos and videos. Facebook, indeed, is perched right at the top of the popularity list, leaving others head and shoulder behind.

There is another significant platform: WhatsApp. Instant messaging platform WhatsApp, which has been acquired by Facebook, has grown to 1.5 billion active users worldwide. It is extremely popular in India and has more than 200 million active users (www.statista.com, 2018).[5] The instant messaging platforms are built around the notion of private communication. Nevertheless the easy availability of WhatsApp on most phones, its easy interface, and group features that allow bulk messages to be sent, has made it one of the hottest tools of communication. WhatsApp is being used to disseminate messages, engage with fellow users, be they college group, a cultural collective, a scientific group or voters. WhatsApp allows people to send text and multimedia messages using mobile data or Wi-Fi networks free of charge, thus avoiding costly SMS messaging. A user doesn't need to create profiles or add friends, the app links directly to his contact list so that someone can send a message to anyone in his phonebook. In the last couple of elections in India, the volunteers or social media coordinators of the political parties worked with the campaign's main WhatsApp channel to send out image posts and messages in hope that the receivers will forward them to others and create a "human chain" of communication.

Why Do People Troll on the Internet?

Holloway (2018) cites a study to say that an estimated 5.6 per cent of people self-identify as online trolls. This translates into millions as the number of daily internet users globally is 3.58 billion (www.statista.com, 2018).[7]

These millions have their distinctive baggage and hence distinctive reasons to troll individuals or communities. The trigger could be such psycho-social issues as narcissism, catharsis, depression, anger, jealousness, loneliness, but they may not be conscious of influencing factor. There are studies to suggest why people troll and what makes trolling so easy. Among the offering *Urban*

Dictionary has is this, too "Being a prick on the internet because you can. Typically unleashing one or more cynical or sarcastic remarks on an innocent by-stander, because it's the internet and, hey, you can."[7]

Mark the language. So 'trollish', if there can be a term like this.

While the obvious reasons are the sense of safety and anonymity that computer screen provides to the trolls. They can hide behind the screen so easily and though lacking in courage to own up their statement, being able to vent out makes them feel strong.

"Strength of the weak ties" (Granovetter, 2011) explains how the internet gives its users the nerve to express themselves. While this attribute can be used by the users to bring about massive social and political mobilization and changes as it happened in Tunisia and Egypt (Stork, 2011), many use it to being a nuisance.

Chaturvedi (2016)argues says that trolling is an organized political activity in India and trolls are the Twitter equivalent of a communally charged mob out to burn down somebody's home (or village) as part of a pogrom.

In a systematic study on trolls, Fox (2014) has listed the following eight factors why someone may post something offensive:

"Anonymity: This is one big factor that evokes that courageous instinct even in cowards to spew their infected opinions online…."

"Perceived Obscurity: Facebook users with accounts tied to their offline identities know they are not anonymous, yet they may have feelings of obscurity. The internet, they think is an unreal and virtual place. They think that they can get away with anything they post simply because people who see or read their posts are just faceless masses they will never come across in real life."

"Perceived Majority Status: The online medium gives a false notion to people that they and their opinion enjoy majority and that is why they tend to express themselves more freely and openly. This is aptly reflected in the spiral of silence theory. Another psychology at work is that there is no fear of getting ostracised, which is usually associated with unpopular opinion that is endorsed by only a handful of people."

"Social Identity Salience: The SIDE model, an abbreviation for social identity model of deindividuation effects says that the social identity online means more than individual identity. There is a strong sense of being a part of the society and aligning oneself with the mass rather than forming or upholding individual beliefs."

"Surrounded by 'Friends': Social Media is a medium that makes everyone feel that they are with people who are their friends, although there is a sky of a gap between the virtual friendship and friendship in real world. Social media, therefore, is kind of a wishy-washy thing with paper roses. Users feel more confident expressing themselves as they anticipate support or agreement from 'friends'."

"Desensitization: Over time, one of the drawbacks of being in the online environment is that we lose our sensitivity towards others. Instead of feeling bad for insulting and hurting others online, we feel okay about it. On the contrary we start finding fault with others, which is at the other end of it."

"Personality Traits: Some people enjoy making other people uncomfortable or angry while some are by their very nature, blunt and outspoken. Personality traits such as self-righteousness and social dominance orientation (in which you think some social groups, typically yours, are inherently better than others) are related to expressing intolerance. Others are 'hard core' believers who will express their opinions no matter what, because they believe their opinion is infallible."

"Perceived Lack of Consequences: The theory of social exchange suggests that we analyze the costs and benefits in our communication and relationships. The false sense of anonymity and obscurity makes individuals believe that they will not be personally responsible for their conduct or misconduct."

Pasricha (2016), in her study "Cyber Violence Against Women In India", reports, "India, as elsewhere in the world, online harassment of women and marginalized genders and sexualities is rampant, in contrast to Internet's initial premise of equal opportunity and neutrality. What we have today is a flawed internet that reflects the offline world we live in, where women and marginalized communities are abused, harassed, threatened, stalked and violated on a daily basis."

Trolling as a phenomenon has swept across websites in recent years, yet the technology it uses is innovating every day. Hence not all societies have been able to have a comprehensive legal framework to stop or regulate it. Punishments have ranged from gentle rap on the knuckles to being put behind bars (de Castell and Brown, 2011).

What the Law Says

In the UK, the Communications Act, 2003, governs the internet, email, mobile phone calls and text messaging. Under section 127 of the act it is an

offence to send messages that are "grossly offensive or of an indecent, obscene or menacing character." The offence occurs whether those targeted actually receive the message or not.

In India, the Information Technology Act, 2000, governs much of the internet play and the players. Based on the UN Model Law on Electronic Commerce 1996 (UNCITRAL Model) recommended by the General Assembly of the UN by a resolution dated January 30, 1997, the Indian act is the primary law in dealing with cybercrime and electronic commerce. The original Act contained 94 sections, divided in 13 chapters and four schedules. The law applies to the whole of India and people of nationalities can also be indicted if the crime involves a computer or network located in India.

A major amendment in 2008 introduced the Section 66A which penalized sending of "offensive messages." It had provisions of imprisonment up to three years, with fine.

The amendment also introduced the Section 69, which gave authorities the power of "interception or monitoring or decryption of any information through any computer resource." child porn, cyber terrorism, and voyeurism. It was passed on 22 December 2008 without any debate in Lok Sabha. The next day it was passed by Rajya Sabha. The then President Pratibha Patil gave it her assent on February 5, 2009. The punishment prescribed is imprisonment up to seven years and fine up to Rs 1,000,000.

On March 24, 2015, the Supreme Court of India, gave the verdict that Section 66A is unconstitutional in entirety. Section 66A of IT Act 2000 is "arbitrarily, excessively and disproportionately invades the right of free speech" provided under Article 19(1) of the Constitution of India. However, the court turned down a plea to strike down sections 69A and 79 of the Act, which deal with the procedure and safeguards for blocking certain websites.

Some High Profile Cases

One of the first high-profile cases emerged in the US state of Missouri in 2006, when 13-year-old Megan Meier killed herself after being bullied online. The bully, Lori Drew, was a middle-aged neighbour who had set up a MySpace account to win – and later betray – her trust. Drew was acquitted of unauthorised computer use in 2009 due to concerns that a conviction would criminalise false online identities (de Castella and Brown, 2011).

In a first, Colm Coss was imprisoned in 2010 for posting obscene messages on Facebook tribute sites, including that of reality show participant Jade Goody

who later died. The following year, Sean Duffy was jailed for 18 weeks after posting offensive messages and videos on tribute pages about young people who had died. One of those he targeted was 15-year-old Natasha MacBryde, who had been killed by a train. "I fell asleep on the track lolz" was one of the messages he left on a Facebook page set up by her family (de Castella and Brown, 2011).

In India, the targets have ranged from commoners like college students to celebrities like film actors and sportspersons. India's first conviction for cyber-stalking since cyber-laws came into existence in 2000 was by a Mumbai court which sent Yogesh Prabhu, 36, an executive in a private company, to jail for three months. In March 2009, Prabhu had sent a series of emails from an anonymous address to a colleague who had earlier rejected his proposal.

This was not the first cyber-stalking case in India. Documents show it was in 2001, when Manish Kathuria was arrested by Delhi Police for impersonating a woman in an internet chatroom. Kathuria was charged under Indian Penal Code (IPC) for "outraging the modesty" of his victim Ritu Kohli. Kathuria would pretend to be her, use obscene language, give out her home phone number and invite callers. That IPC section, however, did not cover internet crimes, and Pavan Duggal, Delhi-based cyber-law expert who worked on the case, explains that it finally fizzled out when a frustrated Kohli moved out of India (Roy, 2015).

Journalist Barkha Dutt has faced vitriol on the internet for her views. She has chronicled it in graphic language in a series "Let's talk about trolls" in the daily *The Hindustan Times* (Dutt, 2017). Gurmeher Kaur, the daughter of a martyred Indian soldier, was trolled viciously when she advocated peace between India and Pakistan. She wrote about it in the same series run by The Hindustan Times (Kaur, 2017).

In 2012, 21-year-old girl Shaheen Dhada from Palghar in Mumbai was severely abused and threatened when she posted a message on Facebook criticising the shutdown in Mumbai for the funeral of Bal Thackeray. Another 20-year-old girl and Rinu Srinivasan got the same treatment for "liking" the post (BBC, 2012).

Earlier this year, a Kerala college student was abused for selling fish in her college uniform. She said she was raising money to pay for her education. The troll was later arrested. Incidentally, the girl Hanan Hamid (Chitra, 2018).

Actor Shruti Seth saw the hate flood unleash on her when she questioned Prime Minister Narendra Modi who had asked Indians to tweet pictures with their daughters. Thousands responded with the #SelfieWithDaughter hashtag,

but she was one of the critics of the "tokenism". As Seth puts it, the "floodgates of hell opened, I was subjected to a tsunami of hate. Men spewed sexual abuse shortly after posting selfies with their daughters." It was worse for activist Kavita Krishnan, who tweeted: "Careful before sharing #SelfieWithDaughter with #LameDuckPM. He has a record of stalking daughters." She was referring to an allegation that police in the western state of Gujarat had spied on a young woman in 2009, at the behest of Mr Modi, who was then the state's chief minister. She was attacked online, with some men posting graphic threats on her Facebook page. "Modi supporters threatened me with rape," she said (Roy, 2015).

Popular daily The Telegraph once compiled celebrities who had got trolled for one reason or the other. These celebrities included actors Alia Bhatt, AlokNath, Neil Nitin Mukesh, Dany Danzongpa, Tiger Shroff, and Prime Minister Narendra Modi. The venom varied from attack on perceived lack of intelligence (Bhatt), to name (Modi, Shroff and Mukesh), onscreen identity of villain (Danzongpa). Enough to show that the attack can come on some flimsy ground. Do one need to recall the *Urban Dictionary* explanation cited above as to why people troll? (*The Hindustan Times*, 2017).

How to Deal with Trolls

That trolling is rampant and it can happen to anybody is obvious. So, what does one do to deal with the trolls? Suggestions are many: give them a befitting retort, take to the police, track and publicly shame them, simply ignore them…. Giving examples, de Castella and Brown (2011) write, "Twitter has given the public direct access to celebrities. And stars, including Stephen Fry and Miranda Hart, have temporarily left the website after coming under fire. Internet experts say the key is not to 'feed the troll' by offering them a response. Comedian Dom Joly takes a different approach."

Moreau (2018) suggests, "If a troll tries to provoke you, just ignore them. They're not worth your time or emotional distress. Try not to take anything personally and remind yourself that their bad behavior does not change who you are."

According to Moreau, a person who seems like a troll is actually the one suffering in some way and is trying to distract themselves and make themselves feel better by taking it out on you. "If you're feeling strong enough, you might even consider responding to them with kindness by complimenting something about them (such as their profile picture, their username, etc). This is the last thing they'll expect from you, and while you'll have to risk being trolled again, there's always a chance that your unexpected kindness could move them in a way that changes their behavior for the better."

Each type of response has its merit, and of course, limitation. For example, Pasricha (2016) found only a third of respondents in her study had reported harassment to law enforcement; among them, 38 per cent characterized the response as "not at all helpful." In the same study, Pasricha found that mechanisms to report abuse on social media platforms fall short. Victims are more likely to block abuse than to report it, yet blocking is ineffective against organized, sustained campaigns using multiple accounts.

What are Social Media Platforms Doing

Thanks to the frequent outrage against the vitriol on social media, especially in plying of fake news and rumours that lead to violence and loss of lives and wealth, platforms promoters have been making efforts to control the trolls. Sometimes they do so on their own and sometimes they are mandated by the governments concerned. For example, the Government of India has recently mandated that social media promoters will be held accountable for the content on them (Pahwa, 2018).[9]

Almost all the popular social media platforms have their origins in the developed western world which places a premium on free speech and other higher human values like right to life and liberty. For example, while Facebook generally promotes free speech, it employs some exceptions on hateful or harassing posts. Facebook also has profanity filters. Similarly, YouTube allows contributors to regulate the traffic but enabling them to limit access to the stuff they upload on the platform.

Article 19 of the UNDHR protects free speech but concern about the misuse of this right on the platforms is growing. Facebook's former marketing director Randi Zuckerberg and Google head Eric Schmidt have both suggested anonymous posting should be phased out (de Castella and Brown, 2011).

While many think that regulation is needed, it must be kept in mind that the internet does not create special threats. It is the people in the public sphere who blurt things offensive. The approach should be to not throw the baby with bathwater. Social media fora and newspaper websites could well employ moderators to prevent the comments descending into hate mongering. Banning online anonymity could be considered, but that would also amount to exposing or even dissuading the whistleblowers to do the yeoman job that they do. Jötnar, gygjars, huderfolk and huldras may be mythical creatures in folklore, but their counterparts exist for the real in the cyberworld. They will be there. Curtailing free speech and trampling upon civil liberties to stop the aberrant few is not a price worth paying.

Notes

1. Merriam-Webster, https://www.merriam-webster.com/dictionary/troll
2. Urban Dictionary, https://www.urbandictionary.com/define.php?term=Trolling
3. "Internet troll", https://en.wikipedia.org/wiki/Internet_troll
4. This statistic shows a timeline with the worldwide number of monthly active Facebook users from 2008 to 2018. As of the second quarter of 2018, Facebook had 2.23 billion monthly active users. In the third quarter of 2012, the number of active Facebook users had surpassed one billion, making it the first social network ever to do so. Active users are those which have logged in to Facebook during the last 30 days. Furthermore, as of the previous quarter the social network had 1.74 billion mobile MAU. The platform is also the most popular social network worldwide.
5. This statistic shows a timeline with the amount of monthly active WhatsApp users worldwide as of December 2017. As of that month, the mobile messaging app announced more than 1.5 billion monthly active users, up from over 1 billion MAU in February 2016. The service is one of the most popular mobile apps worldwide.
6. This statistic gives information on the total number of worldwide internet users from 2005 to 2017. As of the most recent reported period, the number of internet users worldwide was 3.58 billion, up from 3.39 billion in the previous year. Easier access to computers, the modernization of countries around the world and an increased utilization of smartphones has given people the opportunity to use the internet more frequently and with more convenience. However, internet penetration often pertains to the current state of development regarding communications networks. As of March 2017, there were approximately 731 million total internet users in China and 287 million total internet users in the United States. However, broadband internet usage is not equally present in many countries and due to infrastructure reasons, developing online markets rely strongly on mobile connections. Subsequently, global mobile data traffic is set to surpass 49 exabytes per month in 2021, up from 7 exabytes per month as of 2016. Social networking is one of the most popular online activities and Facebook is the most popular online network based on active usage. As of the fourth quarter of 2016, there were a total of roughly 1.86 billion monthly active Facebook users, accounting for almost half of internet users worldwide. Connecting with family and friends, expressing opinions, entertainment and online shopping are amongst the most popular reasons for internet usage.
7. Urban Dictionary, https://www.urbandictionary.com/define.php?term=Trolling; Indian Information Technology Minister Ravi Shankar Prasad in said in the Rajya Sabha (the upper house of Parliament) on the July 26, 2018 that a social media platform cannot evade their "responsibility, accountability and larger commitment to ensure that its platform is not misused on a large scale to spread incorrect facts projected as news and designed to instigate people to commit crime." He also said that "if they do not take adequate and prompt action, then the law of abetment also applies to them."

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The Menace Here to Stay, Better Not Take the Bait

Kriti Singh*

Trolls don't hate people as much as they love the game of hating people.
BBC DOCUMENTARY 'TROLL HUNTERS'

Introduction

In contemporary times, digital communiqué platforms thriving on computer-mediated communication, have gained colossal currency, especially the social media platforms or social networking sites. Due to easy availability of the Internet and smart-phones at affordable prices and the germination of numerous social media platforms and digital spaces for interaction, the communication via social networking sites, brimming with user-generated content, have metamorphosed the very way in which human communication used to transpire in the past. Today, on one single social media platform, we can witness, the convergence of other mass media platforms. However, unlike the traditional communication apparatus of the past, which had professional communicators conceptualising, designing, disseminating and gate-keeping the content or message, the social media flourishes in a more or less, unrestricted freewheeling environment. On social media, the users of social media create the online content, irrespective of the level of communication skills and this

* **The author** is an Assistant Professor in School of Communication, GD Goenka University, Haryana, India.

content is then disseminated by the same users on their desired social media platform, completely uncensored and without any checks and/or balances.

Objective

On the one hand, online social media channels and digital platforms have undeniably, given human communication an opportunity to exponentially develop in a computer-mediated environment, which provides speed, spontaneity, blurring of geographical lines, freedom for the user to create and also distribute content, gain cost-effective, instantaneous responses, and several dynamic, multilayered feedback systems.

On the other hand, the same computer-mediated communication platforms and social media alike, have also opened up a can of worms in the form of various challenges like adverse feedback, social media addiction, disjointedness from the real world, identity thefts which can result in reputation damage and financial implications, misinformation, fake news, cyber stalking, cyber bullying, frauds and scams and so on (the list is endless). However, one glaring negative aspect that has emerged very conspicuously, and which can easily be cited as one of the most afflictive concerns in the present age is the online trolling on digital and social media platforms.

The primary objective of this paper is to understand the concept, origin, repercussions and possible solutions of this phenomenon of 'Internet trolling' in computer-mediated communication, with particular reference to social media trolling, in depth. The paper investigates various dimensions of Internet trolling, which includes, firstly, analysing if 'trolling' is an emerging concept of cyberspace or a renewed memoir of ancient rhetoric.

Secondly, the paper also tries to explain the characteristics of Internet trolls and also the traits of 'Internet troll' – vulnerable targets. Thirdly, it tries to delve into the psychological profile of Internet trolls. Hence, fourthly, it describes the classifications of Internet trolls. Fifthly, a demonstration of the strategies adopted by trolls along with the effect of trolling is described. Sixthly, this paper tries to examine Internet trolling from the gender perspective. Lastly, it has elaborated in some detail on the various strategies that can be employed to cope with the crude actions and cruel intentions of Internet trolls.

Key Terms

(a) Internet Trolls: The word "troll" is from late Middle English and originally meant, "an imaginary, either very large or very small creature in traditional Scandinavian stories, that has magical powers and lives in mountains or caves."[1] However, in cyberspace, an Internet troll is a member of the Internet

community who deliberately posts offensive, provocative, divisive, online abuse; manipulative, and controversial online comments, with the intention of flustering, instigating, or evoking anger in the targeted 'netizen'.[2] The term is also associated with a fishing technique – say your foolish thing, watch the world bite.[3]

(b) Computer-Mediated Communication: It refers to the communication occurring between humans, however with a computer-assisted device. It provides fast communication, instantaneous exchange of thoughts; messages and also has the ability to conceal the identities of the senders and receivers. The online trolls have extensively exploited this element of anonymity provided by computer-mediated communication.

(c) Social Media: *Cambridge English Dictionary* defines social media as "websites and computer programs that allow people to communicate and share information on the Internet using a computer or mobile phone."[4] Kaplan and Haenlin define social media as "A group of Internet-based applications that are built on the ideological and technological foundation of the Web 2.0 which allows their creation in exchange of user-generated content."[5] According to Safko in his book *Social Media Bible,* social media is the media that is continuously used during human communication to be social.[6] Social media foundations rest on the Internet and technologies emerging from new media. Examples of social media include Facebook, Twitter, Instagram, web blogs and so on. The users themselves do the content generation and distribution.

Trolling: A Concept of Cyberspace or Renewed Memoir of Rhetoric?

In digital culture, the latest concept of "online trolling" is being closely observed continuously and studied by several media researchers; however the field requires more scientific data as indicated by a few research studies conducted on the subject. But the critical question that arises is;- is trolling an ancient concept or a new concept originating from the realms of infinitely connected digital spaces?

According to an article, titled, *The Art of Trolling: A Philosophical History of Rhetoric*, trolling is distinctly explained as old as 'history of rhetoric' itself. The article emphasises how the history of rhetoric along with the history of trolling evolved concomitantly. The trails of both can be observed from the times of Sophists[7] from the pre-Socratic school of philosophy in ancient Greece till the present century information societies built on binary numbers of digital blocks. Both rhetoric and trolling have co-evolved from ancient times to contemporary times, and "steeped in philosophy and mythology, spanning across cultures, continents, and time."[8] Today, trolling has proliferated from the oral

and written culture of human communication, into the digital spaces of human communication, where on the present-day, social media is extensively being used by humans to communicate.

Characteristics of Internet Trolls

One of the principal characteristics of a troll is that he/she is an attention seeker who can use deliberately designed online communication on social media, to get an emotional reaction out of his/her target. Secondly, a social media troll can have disingenuous and multifaceted motivations. This can include a variety of topics ranging from self-centred politics, to a playful trickster, or to a 'netizen' who is making an endeavour to be a "modern-day culture hero" or a philanthropist to a vindictive, spiteful, abusive but seldom threatening online narrative fabricator. The third characteristic of a troll is that his/ her malicious intent is to construct a communication and post it to its target audience just to derive amusement out of the emotional reaction incited due to the message or post. It is highly possible that the troll, in reality, doesn't even concur with his/her own virtual narratives.[9] Fourthly, they exhibit antisocial behaviour in digital spaces. Fifthly, they feed on the sense of drama, under the guise of anonymity, camouflage, and absence of authority to keep a check on their nasty online conduct.

Lastly, there is a fine line between haters and trolls. However, the most distinguishing feature between both of them is primarily their agenda. The aim of troll is not to demean the online target but to engage the target in a fight and simultaneously engage the targeted 'netizen's' social network against him/ her and involve more people to group against the set target.[10] However, sometimes these online deviant behaviours can spill over and merge into one.

Characteristics of Targets Vulnerable to Internet Trolls

Trolls tend to target anything and anyone that is likely to bring attention to them. This includes brands, corporate houses, influential public figures, social activists, feminists, journalists, political figures/rivals and so on. Trolls also tend to target vulnerable communities of the society, marginalized groups and women. According to the social media psychologist, Mark Smyth, a member of the Psychology Society of Ireland, "Trolls will underestimate someone based on gender or race, and this simply shows the limitations of their insight. These could be remnants of the old stereotypical patriarchal society, where women and minorities didn't have the opportunity to share their opinion."[11] The underlying intent is to target profoundly sensitive and emotional audiences, that can be in grief, or have marginalized voices that want to be heard and so on.

Psychological Profile of Internet Trolls

The invasion of online trolls in digital spaces has not gone unnoticed in the various spheres of academia; like communication, media studies, anthropology and so on. However, it has created of the maximum interest in the discipline of psychology, wherein the study of trolls has become an interesting case in point. The study titled, *Constructing the Cyber-troll: Psychopathy, Sadism, and Empathy"*, revealed the personality profile of Internet trolls and summarized that trolls have, "higher levels of trait psychopathy, sadism, lower levels of affective empathy, cognitive empathy and are master manipulators of both cyber-settings and their victims' emotions."[12] According to another study titled, "Trolls just want to have fun" by Canada's University of Manitoba, "cyber-trolling appears to be an Internet manifestation of everyday sadism." The study further reveals, "similar patterns of relations between trolling and the Dark Tetrad of personality: trolling correlated positively with sadism, psychopathy, and Machiavellianism."[13]

Classifications of Internet Trolls

Based on the online behaviour of the trolls in digital spaces like social media, in the article titled, "Multidimensionality of online trolling behaviours," reveals four major classifications of trolls, which are as follows:[14]

(a) Serious trolling (not funny and ideologically motivated)

(b) Humorous trolling

(c) Serious non-trolling behaviours

(d) Humorous non-trolling behaviours

The same study also reveals the seven behavioural dimensions of trolls, which can be listed as follows:[15]

(1) Communicated serious opinions;

(2) Representative of public opinions;

(3) Pseudo-sincere;

(4) Intentional;

(5) Provocative;

(6) Repeated; or

(7) Satirical[16]

Furthermore, in the chapter, "What motivates Online Trolling and its Perpetrators," the following kinds of subtypes have also been identified with the online trolling:

(a) Political Trolling: They are political provocateurs, who harass their

target with different political choices with provocative statements, hate speeches, bitter antipathy, extremist thoughts, nastiness, deliberate insulting rhetoric, where political correctness is the first causality.

(b) Religious Trolling: According to *Urban Dictionary*, Religious trolls come in the guise of a supposed spiritual leader who misuses their authority. The aim of the religious troll is to incite hatred and discriminate against people by using religion. The discrimination can be along the lines of religious belief, cultural values, sexual preferences, affiliations and so on.[17] Religious trolls openly distort sacred scriptures to their advantage. They selectively pick up texts, substitute its meaning and use it against others.

(c) RIP Trolling: In this kind of trolling, the usually anonymous trolls, post offensive comments about the deceased and target those individuals in digital spaces who are mourning their loved ones. The recent case in point is the untimely death of late actress Sridevi, and the way trolls targeted the deceased as well as her family members. From citing reasons of "surgery" behind her death to the celebration of her daughter's birthday, or questioning her last rites and so on. This subset of trolls is considered to be 'evoking much stronger emotions' as these are considered sacred timings and spaces for society.

As per another study, titled, "I Do it for the Lulz: A Qualitative & Psychological Analysis of Internet Trolls" following are the common types of trolling:[18]

(a) Griefing: In this, the troll put the victim in a situation, which causes them grief and later on disseminates the victim's reaction on various other social media platforms.

(b) Flaming: In this, the troll deliberately involves the victim or the set target into a verbal argument by bringing up those topics, which can evoke strong emotions and induce hostility. Flaming can be applied independently and also with trolling context.[19]

(c) Raiding: In this troll lays a kind of virtual siege on the victim and assault in a group. Example, recent NDTV News anchor Ravish Kumar's virtual attack by the army of trolls.

(d) Shock Value Trolling: In this, trolls deceptively expose the victim to the content, which evokes 'shock' as a response. This can include obscene material, horror images or video or external link which leads the victim to a shocking/ obscene website.

(e) Bait And Switch Trolling: In this, a troll lures the target into an online deception or prank. Often disguised as a hyperlink similar to target's

interest, but will eventually take the victim to an inappropriate or objectionable webpage.

(f) Advice Trolling: This is another tactic used by trolls to target victims. In this, the troll creates and shares a malicious content in the guise of a piece of advice, which will deceive the victim. Example: Your Mac is under virus attack.

(g) Newbie Trolling: In this, trolls masquerade as novices and put irrelevant questions on virtual discussion boards. The aim is to annoy other group members by posing as a feeble-minded person.

Strategies Adopted by Internet Trolls

Trolls use various strategies against their targets; following are a few of those tactics:

- to delegitimize a legitimate argument or to demolish a counterview or a person/ personality, trolls often use passionate, irrational outbursts, along with hateful maleficent speech.
- they frequently undermine fair discussions or a person/ a personality by dismissing counter views or logic and manufacturing alternative facts to devalue/ demean/ distort the rational counter argument or the person/ personality.
- trolls camouflage themselves under the guise of anonymity or fake names to hide his/ her real identity.
- the language used by the trolls aims at evoking anger; therefore, their expression often includes abuses, sexist remarks, racist remarks, threats, false accusations, etc.
- trolls often bring ideologies into the spotlight and also in ambivalence.[20] They propagate the ideology that they believe in and frequently undermine, derogate and spread manufactured lies against a different ideology.
- trolls also use the "shouting" and the "silencing down" strategy towards their targets.
- they also use the act of 'doxxing' and publish personal information of the victim on various online platforms, like *Aadhar* details, driving license, passport, address, etc.
- they also use racist and sexist threats, rape threats, death threats against their target and their families.

Effects of Internet Trolling

Trolls can disrupt potentially constructive discussions by causing their degeneration into irrelevant antagonism. They can evoke strong emotions and can severely hurt the victim. Trolling can induce problematic psychological effects on the victim's mind.[21] It can lead to low self-esteem, depression, heightened levels of anxiety and so on.[22] Trolls like to legitimise hate speech, bigotry, offensive discourses and conflicting emotions. Trolls cause profound impact on people's embodied identities, cultural and religious beliefs, political inclinations, etc.

However, trolls through their own comments, can reveal their very own ideological inadequacies. Trolls can evoke a sense of insecurity in the minds of the targeted person/ groups. Trolling can cause a forced silence or exit of the target from that digital or social media platform. Trolls are one of the reasons for ravaging the Internet culture, which was to propagate freedom of expressions, exchange of ideas, connecting people from different parts of the world. They can force the victim to change his/ her user id and assume a new masked identity.

Internet Trolling and Gender

When it comes to trolling, research indicates the participation of more men as trolls as compared to women trolls. This negative involvement of men in the computer-mediated environment has been recorded previously and cited many times in the past also. The studies also indicate that men tend to exhibit more antisocial behaviours in digital spaces than their counterparts. As per research studies, trolling is more obvious in a male-dominated arena, a space where they can reinforce their masculine ideology against that in the real world, where their counterparts are successfully breaking it. Research also indicates that the trolling behaviour is contagious. It can start with an individual and spread to online groups and online communities.[23]

A new type of trolling that is slowly emerging from the dark world of online trolls is "gender-trolling". This type of depraved trolling is mostly targeted against women, with the aim to incite fear in the minds of the targetted women and forcing them out of the online discussions, maybe damaging their online reputation and even instilling fear in their minds. Gender trolling is exponentially more vicious, antagonistic, belligerent, threatening, pervasive, enduring and it employs an extensive usage of graphics, sexualised and gender-based abuses/ insults to demean women as sexual objects and actually belittle them for just being women. They also use death and rape threats as a weapon against their victims.[24]

Strategy to Cope Up with Trolls

As computer-mediated communication has become omnipresent in everyday human interaction, the intrusive nature of this communication poses a pervasive threat to its users. Internet trolling is one of the dangers lurking in the cyberspaces. However, one can adopt a few strategies to counter and to some extent minimise the impact of trolling. First, ignoring and blocking trolls is the most practical way. Second, use 'report abuse' option available at social media sites/apps. Third, on social media platforms and online discussion forums, the presence of a sensible moderator at the comment sections and online discussion forum can reduce the effect of a troll by not allowing him/ her to post offensive messages online. Fourth, opting from privacy settings to keep the door closed for the trolls. Fifth, avoid posting your email id, mobile numbers on social media platforms. Sixth, on online discussion forums, one can also up- and down-voting system at comments section is another way to discourage trolls. At places, where it is possible, one can use disable comments option. Seventh, keep in mind that the trolls use baits of provocation to trigger a desired response from the victim, the sensible thing to do is to not to fall for the bait.

Eighth, as an online community response to the victim of internet trolling, flooding the victim's online social media platforms with sympathy and kindness by fellow social media user is also a counter strategy used by the online community against trolls.[25] Ninth, usage of "humour" can be employed as one of the strategies to counter trolls. Lastly, technology can also be employed to fight against the trolls. In 2015, Google funded a study, which constructed an algorithm to identify trolls and ban trolls.[26] Apps to counter trolls are also picking up in the online market. Apps like Heartmob or Trollbusters helps online users to report trolls and seek assistance from others. In 2017, Indian Government also announced the launch of "I am Trolled" app.[27] Lately, to tackle the menace of trolls, use of Sentic Computing is being advocated, that will effectively analysis of natural language text and can assist in detecting trolls, therefore prevent web-users from falling in the trap of trolls.[28]

Conclusion

Although trolling is an ancient trait of human behaviour and/or human communication, it seems to have simultaneously evolved with the history of rhetoric. However, with the dawn of digital technologies, and the existence and augmentation of digital spaces along with rapidly progressive, communication technologies, it has reincarnated itself with new vigour. It has been propelled into an unexplored digital territory, which had not been experienced in the past.

Recent trends also show that Internet trolls have steadily spread their destructive ways in various dimensions of digital spaces. The crucial question that arises is whether it is just gaining attention or amusement at the expense of others like a trickster or do these trolls have the capacity to influence politics, create disharmony, suppress ideas, propagate fake news, shape legislation and even acquire positions of influence where they can actually challenge the very threads that have been binding societies till now?

The negative impact of trolls on the virtual computer-mediated world of social media users is as severe as in real world. Many research studies have revealed that the psychological effects of experiencing trolling online are similar to the psychological effects of offline harassment.[29] The menace of trolls seems to be here to stay, but the answer is to not take the bait, and, rather choose discourses and online acquaintances wisely, self-monitor the social media networks and digital conversations, using strong privacy settings, and ultimately using the very technology being misused by the trolls against them and above all, collectively as well as individually, building psychological and emotional resilience against the trolls.

Notes

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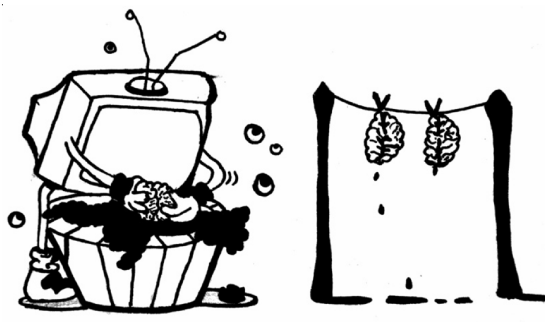
Need a New Way to Decide What is Trustworthy

Binita Parikh*

"There was a Fatwa in Saudi Arabia that men can eat their wives if hungry" if anyone was to come and tell you this, implying that men in Saudi Arabia have the legal and religious sanction to kill and eat their wives if they are hungry, would you believe it? Hopefully not! But one of India's leading news networks fell for this piece of 'fake news' and flashed it as real news.

Similarly, Times Now channel fell for the 'fake news' of a rate card doing rounds that there was a cash offer from a militant, Muslim organisation to convert Hindu girls, the "offered rate" for converting a Hindu Brahmin girl was five lakhs, while seven lacs rupees was offered for a Sikh Punjabi girl.



This, in no way reflects some falling standards of media, but actually points to pervasiveness of a social phenomenon that is being witnessed worldwide.

The Phenomenon of 'Fake News'

Simply put, 'fake news' are false stories, often of a sensational nature, that appear to be news, and are spread on the internet or using other media, usually created to influence views or as a joke. While they are created to be widely

* **The author** is an independent communications professional, and a Visiting Faculty at the Pandit Deendayal Petroleum University, Gujarat.

shared online, the purpose for which they are created, could range from that of generating advertisement revenue via web traffic or discrediting a public figure, political movement, or an entity, or even creating a public sentiment or social thought.

It was way back in 1938 that Orson Welles broadcasted a story that armed Martians were invading New Jersey. Welles' brilliantly spun radio broadcast of *The War of the Worlds* created a widespread panic, with the newspapers too, picking up the story. The next morning, Welles did apologize, and clarified that his broadcast was a prank, to prove that Americans could be convinced of anything, even a story as preposterous as armed Martians, and thus it did not perpetuate.

But today, the scenario of 'fake news' has evolved a long way from that. Virulence and the ease of spreading 'fake news' is posing a danger to society and the new social order created by technology is disrupting the way society thinks, gets information and believes and acts.

'Information' is a major power and control centre and the explosion of new ways of dissemination of information has changed the paradigm of how society collects, screens, and disseminates information. A disrupted power centre implies social upheaval with new centres jostling for power, spaces being demarcated, and new power centres being created. That ripple of disturbance caused by technology that has broken the existing information hierarchy in the society that was a major power centre is also of major importance while we are discussing the 'hoo-ha' around 'fake news'.

'Fake News' Problem Multifaceted

Firstly, there are creators of 'fake news'. There are now people and organisations that exploit the gullibility of unsuspecting audiences by 'fake news', for example, in the run-up to the US presidential elections in 2016, a made-up story spread on social media claimed that a paedophile ring involving high-profile members of the Democratic Party was operating out of the basement of a pizza restaurant in Washington DC. In early December 2017, a man walked into the restaurant – which by the way, did not have a basement – and fired an assault rifle. He had expected to find children or their remains in the basement. Remarkably, no one was hurt. But it proves that the effect and impact of misinformation can never be underestimated.

An exclusive IPSOS poll conducted in 2016 for 'BuzzFeed' News found that 75 per cent of American adults viewed a 'fake news' headline as accurate, especially the people who cite Facebook as a major source of their news. In

fact, a global debate around the phenomenon of 'fake news' has exploded at a world level since the election of Donald Trump as the US president.

The impact of 'fake news' in the American presidential elections and even the Brexit voting brought to fore the danger of manipulation of the masses. As a consequence, questions around the veracity and authenticity of journalism – what journalism is, in the digital age and how we can distinguish it from non-journalism or 'fake news' has risen to the top of public, political and scholarly research agendas.

Studies on multiple aspects of the impact of social media, spread of 'fake news', creation of 'fake news', gullibility in believing the 'fake news', business models of 'fake news', the ways to fight it, etc. have all been initiated and discussed in America. With the super speed with which the rest of the world is being digitalized, India, too has been ensnared in this 'fake news' web.

Secondly, the impact of the 'fake news' is to be noted. The stakes are higher than just journalism, elections and making someone the most powerful person in society. What it opens up is another more dangerous vista; the proverbial can of worms. The world social order is stacked on the assumption that every single person is capable of making an informed, logical decision about the society, and hence, the 'one person- one vote' principle is being advocated as the best form of representative governance. However, 'fake news' has hit at this very core of democracy and thus indirectly questioned the stable world order of "informed decision". Now the question arises, "if a person is misinformed, or misled to believe something incorrect, will or can democracy and the social order as we know it, still survive?"

This is the main crux of the problem and the reason why everyone is up in arms about 'fake news'. Thus, having a large number of people in a society who are misinformed or disinformed is absolutely devastating, disruptive and dangerous for the society, itself.

Thirdly, it has also been brought to fore, the question of how the internet has completely changed the paradigm of how the society receives, distributes and consumes information and news, whether true or fake news.

There is a breakdown in the information from trusted sources of information, namely the established media houses who swore by ethical practices, ensured accuracy and verified news before creating information and distributing it to a larger audience. With the increasing reach of the internet and social media, the information paradigm is irrevocable disrupted and any one (whether trusted or not) can be an information creator and distributor.

While the idea of digitalized India is welcomed, and it is true that it has revolutionised many a sector, from tender allocations to revenue departments, from delivering medical aid to conducting educational classes, it should also be remembered that it has also heralded an era where we are literally in deep digitalized waters without knowing how to swim properly, without a life jacket and utterly unaware of the life-threatening dangers lurking around.

The digital invasion has completely changed the way we are living. We are now getting access to some fantastic things that we never thought of, like reading great international authors, getting exposed to new trends, knowing about successful innovations anywhere in the world, hearing the best music ever, finding like-minded people, connecting with them, communicating with our friends and relations not just across the country but across the world. But it is also making some of us very sick. Children are being lured to mutilate and kill themselves.

So, fourthly, it brings us to the question of who we are letting into our lives, mind and personal space with all these digital innovations. In the past, in the era before digitalisation, strangers, whose intentions and agendas were not clear were never welcome in our houses or societies; people had to prove through action and words, to be accepted as leaders who we could believe and follow. Now, however, whatever search engines throw up is considered as correct and believable and complete strangers, who may actually be predators are being accepted as the ultimate truth and are allowed to influence many of our important life decisions!

What it really means is that anyone can say anything, and make you believe in it, with the help of technology. The difference that social media has made is the scale and the ability to find others who share your world view. It will create bubbles of alternative reality, where you are connected to people who are sharing things with you that are equally false, but the cumulative action of all the people sharing fake things create an environment where others are snared into, believing the false things to be true. Any attempt to break through these bubbles are rejected and dismissed as being part of a conspiracy to enforce a "wrong" point of view!

This self-reinforcing bubble is supplemented by technology and algorithms that constantly watch what you are reading, and supplement you with similar material, thus expanding the bubble and creating an exaggerated "echo chamber" effect. Thus, what is to be noted is that from someone verifying and choosing what we are informed about, now information, is verified, biased, slanted, manipulated, falsified, baiting in nature, bigoted, etc., and spreads around the world in seconds, with the potential of reaching billions of people in mere

seconds. On the other end of the spectrum, due to the information explosion, lots of information, which may have a lot of potential for good, is also dismissed with a flick of the finger.

What information we choose to consume, whom we choose to engage with is self-reinforcing and we are shown more of the same. The space for a contradictory point of view is minimizing. What we believe is correct, and we keep connecting with people on the net, who believe in what we do, rather than talking to people around us, weighing both sides of an argument and giving acceptance and space to an opposing point of view.

Fifth point to ponder is who is accessing all this wealth of information that is so easily available and what use are they are putting it to? For example, a boy in Florida who slaughtered 14 of his classmates and three of his teachers spent months telling a private 'Instagram®' group that black people and Mexicans should be kept in chains and that white women who married African-Americans had committed treason. He had been insisting that he had been possessed by a demon who was urging him to "Burn. Destroy. Kill." We need to explain to the digital netizens that life is not a role-playing game.

The combined effect of all this is that, while we surf up in this digitalized world, we "feel" safe. So, we let go of a lot of our apprehensions and thus we believe in what we see on the net. That is the reason why we see false messages about child kidnappers going viral on 'WhatsApp', prompting fearful mobs to kill two dozen innocent people.

It did awaken the Indian society to the impact of dangers of digital 'fake news' on society. "That something being forwarded on the net" has taken control of people's minds, is feeding on their insecurities and making them react out of proportion of an artificially created fear. The multiple mob lynching incidents across the country, that took a toll of more than 28 people made the government sit up, and also drew sharp reactions from the Supreme Court. The government then slapped the messaging platform 'WhatsApp' with two notices, in August 2018, with the second one warning the platform that it will treat the messaging platform as an 'abettor' of rumour propagation and legal consequences will follow, if adequate checks were not put in place. 'WhatsApp' has responded to the Indian government's actions by limiting the number of forwards to 5, but is that really adequate? Given the stakes and motivations involved in creating and spreading 'fake news', the answer seems to be a 'Woeful No'!

The world over, governments are taking notice of this problem, the British Parliament too has set up a committee to discuss the issue of how social media

is being misused by some to misinform and potentially incite. The internet, with its free and open nature, has rapidly grown in the last decade-and-a-half and touched everything from consumer lives to governments. The Internet, today, to many is intermediated through various platforms like Facebook, Google, 'WhatsApp' and other messenger apps that all sit on the internet and collectively either constitute messaging, or search functionalities, to consumers.

The paradox is that, while we want government action, we also fiercely want to safeguard our right to freedom of expression and do not want the governments to restrict that. We do not want governments to restrict or curtail the freedom to use these apps or the internet services. The technology giants are refusing to hand over the encryption codes to authorities, as it would lead to breaching of privacy and the governments could easily snoop on the activity of any citizen. So, the fight that should focus on apprehending the perpetrators or spreaders of the 'fake news', is being shifted to various other unrelated factors.

The fight against 'fake news' is made more complex by the fact that the 'fake news' going around in the city differs, based on purpose content, and intention.

Types of Fake News

We can say that broadly speaking, there are two kinds of 'fake news', based on content:

1. False stories that are made up deliberately, where the creator knows that the content is false, but still creates/ publishes it. These are deliberate lies that are put online, even though the person writing them knows that they are made up.
2. Then, there are stories that *may* have some truth to them, but are not completely accurate. This is because the people writing them - for example, journalists or bloggers - don't check *all* of the facts before publishing the story, or they might exaggerate some of it, or may have been lured into believing what they are publishing is the truth.

   For example, the news broadcasted by Aajtak, and Times Now, mentioned earlier fall in this second category. Here, the intention is not to mislead or to disinform. So naturally, additional diligence before publishing, especially by news agencies, is one of the solutions to fight the 'fake news' problem.

More challenging is the 'fake news' that is made viral, knowing that it is 'fake'. Broadly, speaking, this news is created to spread misinformation to propagate a political/social view, or for monetization, to earn from clicks. With

easily available and free technology on the net, it is also much easier than it used to be to edit photos, and create fake websites and stories that look realistic.

Moreover, misleading and sensational headings with raunchy photographs still act as click baits i.e. they attract the surfer's attention and they click on these headlines to know more.

It is these kinds of messages that create the menace of 'fake news'; moreover, the problem is compounded by people who keep on forwarding these messages. Simply speaking, people also tend to share things that they agree with, feel they are the first to share, or have received it from someone they trust.

This compounds the problem and is one of the reasons why even after a 'fake news' is busted, i.e. proven fake, the correction does not go viral.

One example of this, that Paul Resnick, of the University of Michigan and his team, investigating the impact of 'fake news', found, was a mistake that appeared in a leaked draft of a World Health Organisation (WHO) report that stated many people in Greece who had HIV had infected themselves in an attempt to get welfare benefits. The WHO put out a correction, but even so, the initial mistake reached far more people than the correction did. Another example is the recent rumour about the death of former Prime Minister of India Atal Bihari Vajpayee, which had the government issuing statements about his health status.

Whatever, may be the reason, it is a fact that people do forward stories that they are not sure of; they also forward photos they may have not clicked; and they forward slanderous material, just because it is funny, i.e. people, (including you and me), forward stories that we have not verified.

So, the "citizen journalists" themselves get duped, and act as agents of the duper as they get sucked into a digital bubble that is actually completely different to the real world – and a long way from the truth.

An entirely new element is added to the 'fake news' rhetoric, when the so called 'fake news' turns out to be, not really 'fake news'! Sometimes, a story might be branded as 'fake' (when actually it isn't) by someone, or a group of people, who do not want to accept that the news is true – even if it might be. This is one of the reasons why many groups are now actually questioning the credibility of media. Any negative news, (or news that reflects a different view from the one they wish to propagate) which may actually be true is dismissed as 'fake' by these people, just because they do not want it to be true. These ideologically motivated people will call something 'fake news', when it is not really, and this leads to the fact that some people do not know what to believe anymore. This has ultimately resulted in creating doubts in the minds of people

about the authenticity and the credibility of traditional media, and even scientific reports and study. The traditional watchdogs and safeguards put in place to ensure that those in power are honest, are being circumvented by the social media.

This is supported by the fact that in today's world, people do not agree with official sources of information at all. Governments and media around the world are facing increasing scepticism about what they are giving out as information, and thus, alternative sources of information are getting strongholds as "sharing right information." This has led to a vicious circle of information and misinformation or disinformation. Facebook has been used by political bodies to put out information, pay for advertising, put it in front of millions of people. What is worrisome is that those who are not being targeted by these advertisements will not even know about such a massive information campaign going on, and the changing scenario around them.

In the era of digital marketing, anyone can target people based on how old they are, where they live, what skin colour they have, what gender they are, what they usually surf about, who are their connects etc. We should not think of social media as just a peer-to-peer communication – it is also "the most powerful advertising platform there has ever been."

Thus, social media is no longer just a peer-to-peer communication; it now also has the most powerful advertising platform which can be used to change or create rhetoric, that can and will finally change the social dialogue, as it is easy to spend money and advertise to influence millions of people and not have the other millions of notice.

Just as the problem of 'fake news' is manifold, the solution to fight the menace of 'fake news' is also manifold. For those leading the push to fact-check information, technological interventions like better tagging of accurate information, adding layers of credibility to sources, disrupting business models of click-baits, improving algorithms to crack 'fake news' offenders and improve black-list offenders are on the anvil.

Another part of the solution would be providing people with the resources to fact-check information for themselves. Many initiatives like Google News Initiative by Google, firstdraft.com by Harvard University, etc. are working to develop awareness about the free resources available on the net to help individual and professional fact-checkers to cross check information.

Twitter and Facebook both insist they have strict rules on what can be advertised and particularly on political advertising.

While there is lot of pressure of digital platforms like Facebook, Google, WhatsApp, Snapchat, Instagram, etc to come up with solutions, the fact of the matter is that there is no quick-fix 'tech solution' to this problem, simply because, the 'fake news' problem is not simple but rather complex and multi-faceted.

Expecting engineers to come up with solutions overnight, is trivializing the issue and a very crucial, negative element in the 'fake news' phenomenon. Basically because, "techies" cannot create algorithms that will teach machines to decide what is true or false in a world where humans themselves do not agree as to what is true and what is not.

The problem in tackling the 'fake news' menace is not just combating with a few malicious 'bots' or chaos-loving trolls or even money-oriented teenagers pushing phony stories for clicks and thus profit. The problem is also the gullible readers.

'Fake news' is 'fake' but it gets viral because it promises otherwise. Can 'fake news' create an alternative reality just by reinforcing it? It also throws up philosophical questions like who define the truth, and what is the truth? The major upheaval caused by technology is that Truth as dictated by a "powerful few" has ceased to exist, and rather, truth is what is networked by and among peers. So, for every fact put out by someone, there is a counter fact. All those counter facts and facts look identical online, which is confusing to most people, and they tend to believe those people who are reaching out to them trough the social media. Most people, who are under the onslaught of social media, do not have the time to cross verify the information, and they tend to believe mostly those people who they are in contact with, irrespective of the veracity of the facts.

Thus, 'WhatsApp', in its response to government notices, has now, actually taken some initiatives to curb this type of a 'fake news' circulation, outlining new rules and regulations to hopefully curb the menace of misinformation by including education and some form of advocacy efforts. While technology can help, education, awareness, and finally action by the end users is the only cure to fight the menace of 'fake news'. More challenging is the attitude of some people, who feel that 'fake news' are by "others" and as people or society, they themselves will not be affected. This is an absolute fallacy. Every user, who forwards a story, is impersonating as a journalist. Thus, every forward should be done diligently.

There are very simple tools that are freely available on the internet that one can employ to weed out 'fake news'. One can do a reverse image search of

Google, use other search engines like 'Yandex' or 'Tinyeye' search, even break down collages to search for images, take screenshots of videos to ensure image search, etc.

A look at the original source of information and checking its credibility is the most crucial of all other parameters. For example, Wikipedia which many youngsters use as an online reference, can be edited by anyone and uses teams of volunteer editors to weed out inaccuracies – is far from perfect. Inaccurate information is a regular feature on the website and requires careful cross-checking for anyone wanting to use it.

There are also mirror websites that pretend to be the real one. For example, we have come across many "free offers" from Google. It is important to check the extension. The name just before the dot is important, like google.com is correct, while <google.freeoffer.com> is a fake website.

Above all, one should let basic journalistic sense and scepticism prevail. One must understand the context, connect the impact of a message, and ask oneself basic questions like, 'Is this plausible? ... Who is saying this? ... What will be the impact? ... Are a lot of people talking about it? ... Is credible media talking about it? ... Which organisations have published the story? ... Does the story *sound* believable? ... etc. If the answer to any of these questions is 'no', then it requires a further check, a reality check before forwarding and spreading the word.

Moreover, keeping an open mind and developing critical thinking skills is the key to overcoming the phenomenon of 'fake news'. It will help overcome the bias in the way people understand the world in a language in which they tend to seek and accept information which confirms to their existing beliefs, while rejecting information that contradicts those beliefs.

To conclude, one can say that the way the young adults are consuming news, it may make the traditional media services and agencies less relevant, and sometimes, even end up making the 'fake news' more real than the actual real news programs. Concern over this problem is now becoming universal with global proportions and ramifications. However, much remains unknown regarding the vulnerabilities of individuals, institutions, and society to the manipulations by such malicious actors.

A new system of safeguards has now become necessary to combat this evil. We need a new way to decide what is trustworthy. We need to recreate a system at this stage, of whom to believe in, not just what to believe in.

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Articles

Swati Gupta*

Financing India's Renewable Energy Targets: Modes and Challenges

Abstract

The Renewable Energy Sector of India is considered to be the world's second most attractive Renewable Energy market.[1] In terms of the total, installed wind power capacity, India ranks fourth worldwide. In the previous year itself, (i.e. January-November 2017) India added 11.788 GW of the total power generation capacity from renewable sources.[2] With the Government's increased support, along with enhanced, developed and improved economics, the Renewable Energy Sector is becoming more and more attractive to investors. The energy demand of India is expected to reach 15,820 TWh by 2040[3] and as India is gearing up to become self-sufficient and meet this requirement on its own, Renewable and Clean energy is expected to take on an important role. It is expected that by 2040, 49% of the total electricity obtained is to be generated through renewable energy[4].

With the commitment of the Government of India to increase use of clean energy sources, the Ministry of New and Renewable Energy (MNRE) has set a target to set up renewable energy capacities to the extent of 175 GW by 2022[5] (which includes 100 GW from Solar, 60 GW from Wind, 10 GW from Biopower and 5 GW from Small Hydro power units[6]), as was announced in 2015. To fund this ambitious plan, India would need at least US$ 125 billion.[7] The 'renewable energy industry' financing is considered difficult due to its characteristics of high initial investment, investment risk and dicey long-term investment returns. Keeping this as a backdrop, this article aims at discussing the various Financing modes currently in use and the various financing challenges to be faced in meeting India's Renewable Energy Targets in the coming years.

* **The author** is a Visiting Faculty specializing on Finance and Strategy in Jain University, Bangalore.

Prelude

The last few years have experienced growing concerns over climate change, which has led to governments and industries across economies seeking to supply energy and meeting their countries' energy requirements by creating new measures to aid in minimizing environmental impacts such as gas emissions and the like. Countries are facing issues such as limited stock of Fossil Fuel, increased carbon emissions and Global Warming and have thus started investing in green energy, which now seems to be the best alternative and the only possible future. A major policy strategy across many economies is the employment of Renewable Energy Sources. The access to clean energy and meeting sustainable holistic development goals are reasons that have led to the transformation of many developing countries to more sustainable economies. The increase in population growth, higher living standards and energy demands influence the development of any country. According to estimations, the global population is going to be 2.3 billion more by 2050 while energy demand is to increase by 21% by 2030.[8] This will have major implications on the infrastructure of the energy sector and how the energy needs will be met in future. All this would then naturally be directed at efficiency, effectiveness and economy. Any decision made in the sector would have effects throughout the economy considering its direct connection to sustainability of a country's economy. Access and availability of timely finance remains a challenge in many developing countries.

1.1 Renewable Energy: Global Scenario

In 2016, worldwide, renewable energy (excluding large hydro plants) accounted for 55.3% of the new electricity generating capacity. This was the second successive year it had exceeded 50%.[9] In order of Net GW installed in 2015, Solar Power added significantly more GW followed by Wind, Coal, Gas, Large Hydro, Nuclear and Biomass. In 2016, Renewable energy (excluding large hydro) produced an estimated 11.3% of the world's electricity, an increase from 10.3% in 2015 and 6.9% in 2011.[10]

New Investments in Renewable Power Globally and Fuels Today in Developed, Emerging and Developing Countries, 2006-2016

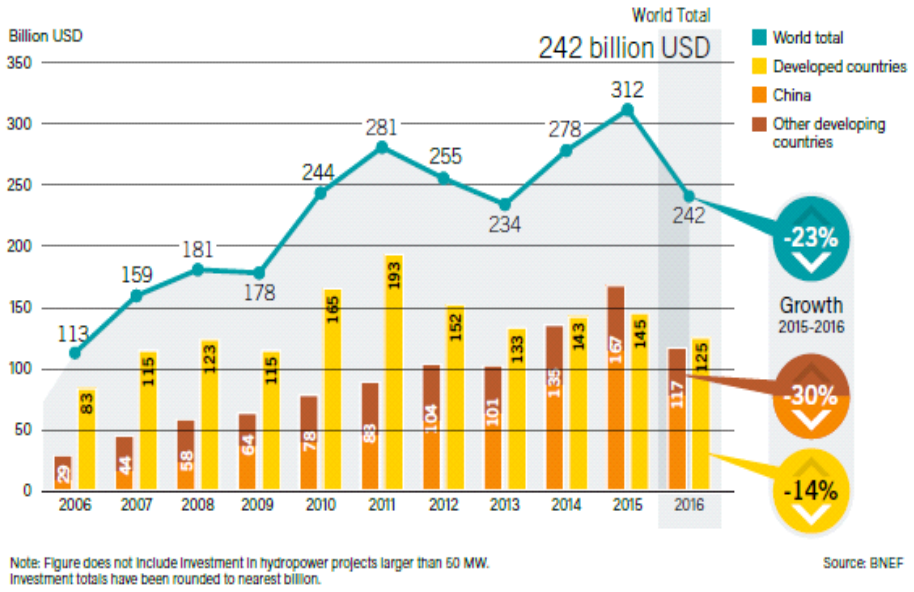
Renewable energy investment in developed countries, went down by 14% to USD 125 billion in 2016.[11] The investment in Japan and the United States fell, while Europe saw a marginal increase in the same. While Renewable energy investment fell 30%, to USD 116.6 billion, among developing and emerging countries[12]. In terms of investment in Renewables in 2016, capacity went down by 23% in terms of dollars ($) (world total), though of course the year was a

strong year for investment in energy smart technologies.[13] Asset finance for smart meters and energy storage, plus equity, raised for specialist companies in energy efficiency, storage and electric vehicles, went up by 29% to $41.6 billion.[14]

The main reasons for the decline in global investment in renewable energy during 2016 could be enumerated as:

1. the slowdown in investments in Japan, China and some other emerging countries and
2. the significant cost reductions in solar PV and onshore and offshore wind power, which led to the improvement of cost-competitiveness of those technologies.[15]

This resulted in investors being able to acquire more Renewable energy capacity for lesser price.

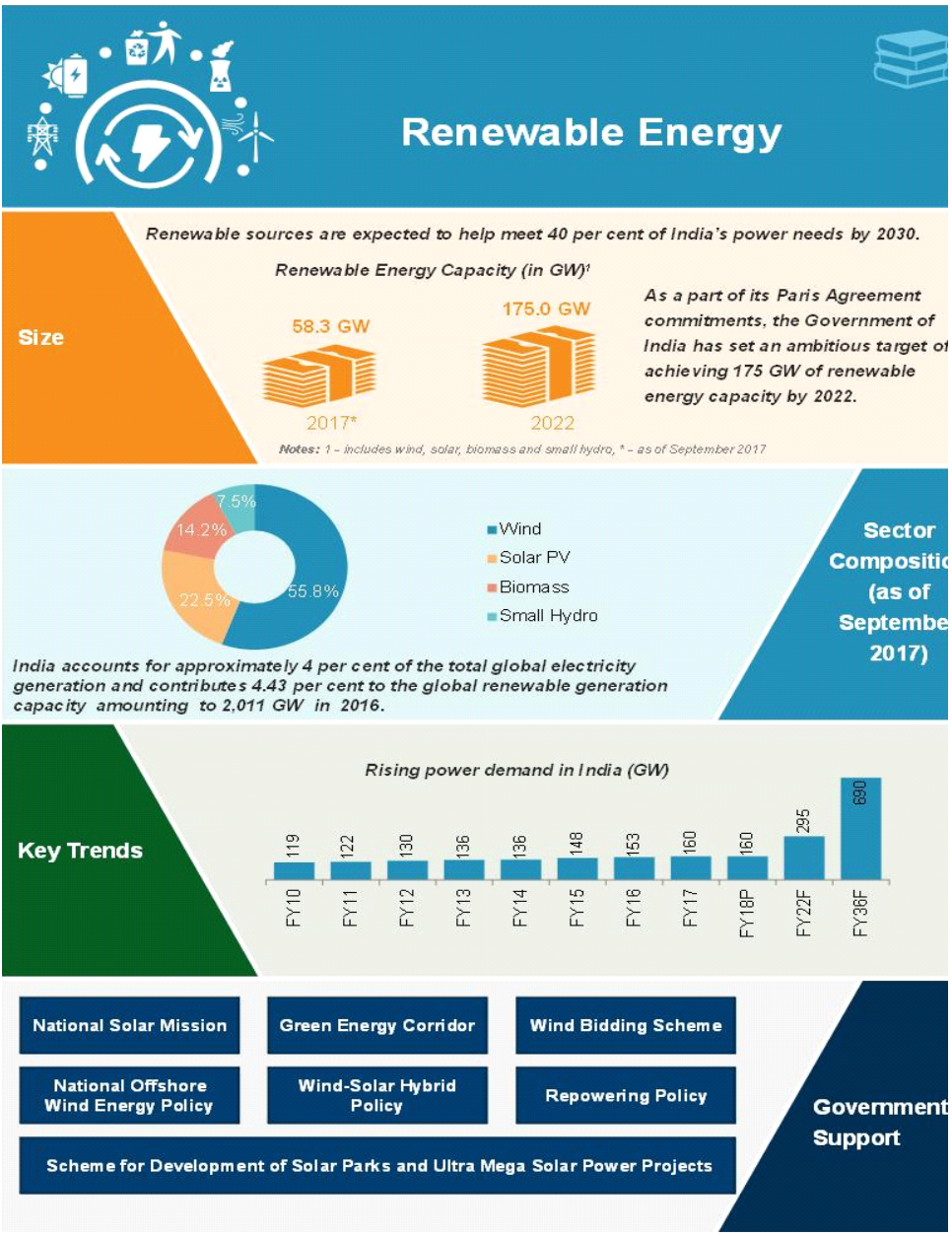


Source: REN21, "Renewables 2017 Global Status Report" (Paris: REN21 Secretariat).

Fig 1: Global New Investment in Renewable Power and Fuels: Developed, Emerging and Developing Countries, 2006-2016.

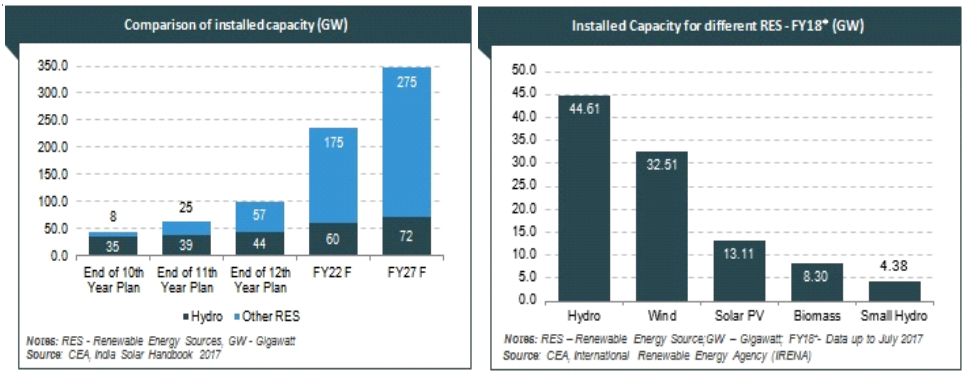
1.2 India's Renewable Energy Sector

1.2.1 Sector Overview



Source: IBEF[16]

Fig. 2: Renewable Energy Sector



According to IBEF Sector Report[17], the CAGR in installed capacity over the period FY07 to forecasted FY18 was 2.32 % for Hydro power and 20.12 % for other renewable energy sources. The Government of India projects 17.04% CAGR increase in other RES installed capacity to 275 GW by 2027.The total renewable power generation installed capacity in India stood at 103.92 GW as on July 2017 accounting for 31.2 % of the total installed capacity, with hydro power forming the largest source of energy accounting for over 43% of the total renewable power generation installed capacity.

Source: IBEF[18]

Fig. 3: Renewable Energy Sector Trends

1.2.2 Targets for Renewable Power Installed Capacity and/or Generation

The target for renewable power installed capacity has been set at 175GW to be achieved by 2022.

India	**Capacity (not specified)**	**175 GW by 2022**
	Bio-power	**10 GW by 2022**
	Hydropower (small-scale)[1]	**5 GW by 2022**
	Solar PV	**20 million solar lighting systems added 2010-2022**
	Solar PV and CSP	**100 GW by 2022**
	Wind power	**60 GW by 2022**
Andhra Pradesh	***Solar PV***	***5,000 MW added between 2015 and 2020***
Jharkhand	***Solar PV***	***2,650 MW installed by 2019-2020***

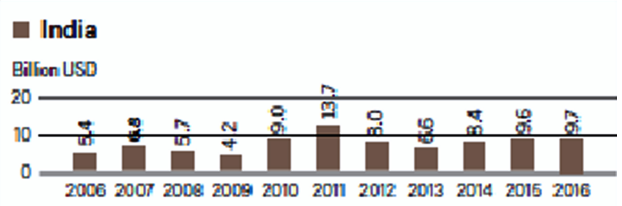
Source: REN21 *Renewables 2017 Global Status Report* (Paris: REN21 Secretariat).

Fig. 4: Targets for renewable power installed capacity and/or generation

As per a Climate Policy Initiative report, the renewable energy sector in India will require 189 Billion USD in additional investment in order to meet this target which includes 57 billion USD in equity, and $132 billion in debt (the report has estimated this using capital expenditure forecasting for renewable energy projects between 2016 and 2022).[19] According to the report, the potential for investment in the renewable energy sector is 411 billion USD up to 2022 which is more than double of the investment required. The investment potential for equity and for debt is $220 billion and $191 billion respectively which indicates that there is a huge investment potential is available for financing India's Renewable Energy Targets by the year 2022.[20]

2. Financing India's Renewable Energy Targets: Financing Modes and Challenges

2.1 New Investment in Renewable Power and Fuels Trend from 2006 to 2016



Source: REN21, *Renewables 2017 Global Status Report* (Paris: REN21 Secretariat).[21]

Fig. 4: New Investment in Renewable Power and Fuels

2.2 Financing India's Renewable Energy Targets: Financing Modes

2.2.1 Equity

Equity is one of the traditional sources of financing renewable energy is Equity. The sources of equity capital for renewable energy projects have seen a significant change: from majority of the projects being funded by Private equities, Corporates, Venture Capitals and the alternate investment markets, as was seen between 2009-2013, (which itself indicated the relatively high risk involved in the business) to funding through pension funds, sovereign funds, large Indian and Global utilities and infrastructure investment trusts[22], that have and will be triggered by the scale of renewable energy businesses and policies governing the sector and financing of the same.

2.2.2 Debt

As was observed in Equity, debt funding for renewable energy projects also saw significant changes in terms of the source of the financing. Initially, renewable energy projects were funded by banks and NBFCs. Of late, while there has been an expansion in bank debt financing, in terms of flexibility of leverage, the infrastructure debt funds are predominant in refinancing the operating renewable energy projects.[23] This has led to improvements of the returns from projects and thus reducing the debt load on the balance sheets of banks and NBFCs, further enabling enhanced lending. The most noteworthy development in debt financing has been the ability of renewable energy projects to access the same through debt capital markets. Over the last few years, there have been significant issuances of bonds from both domestic and international investors.

The two most innovative debt capital market instruments have been 'Green Bonds' and 'Masala Bonds' that have led to further improvement in the pricing and returns of the projects[24]. Masala bonds refer to Bonds that are issued outside India but denominated in Indian Rupees, rather than in their local currency.[25] In Masala Bonds, the investors bear the risk, as opposed to dollar bonds where the borrower takes the currency risk.[26] Green Bonds are financial instruments where the proceeds are set aside for investing exclusively in renewable energy, energy efficiency and other climate smart projects in developing countries.[27] Green Bonds aid in raising capital and investment for existing and new projects with environmental benefits.[28] Since the time SEBI issued its Green Bond Regulations in May 2017, the cumulative Green Bond issuance in India has more than doubled to $6.5 billion.[29]

The other sources of financing renewable energy projects include foreign financial agencies like the US export-import bank (EXIM) and the Asian Development Bank (ADB), funds from them are generally routed through banks and NBFCs.[30]

Current incentives impacting financing of renewable energy include:[31]

(a) The National Clean Energy Fund (NCEF), created to support entrepreneurial ventures and research in the field of clean energy technologies, and soft loans from Indian Renewable Energy Development Agency (IREDA)

(b) Tax free bond issuance – The Government has permitted a few entities, IREDA among them, to issue tax free bonds to the public in terms of Section 10(15)(iv)(h) of the Income Tax Act and the CBDT Notification, with interest rate lower than comparable bonds and having long tenures of 10, 15, and 20 years, which provides the entities with cheaper sources of funding and in which the benefits can be passed on to the borrower.[32]

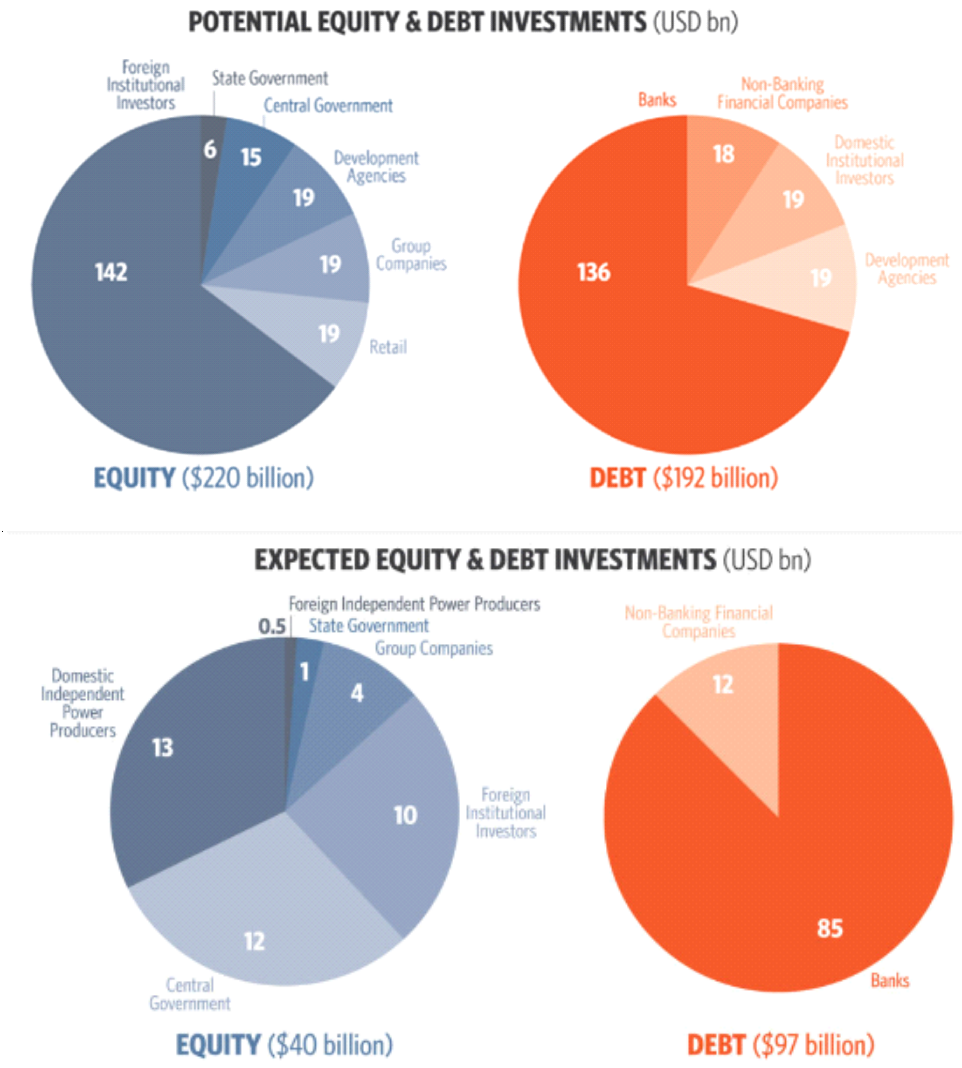
2.2.3 Mergers and Acquisitions (M&As)

India is emerging as one of the most attractive countries for renewable energy investment. Experts in the industry feel that renewable energy is expected to see momentous activity in terms of capital-raising and M&As.[33] According to an article,[34] the sector has seen a number of M&A's drivers in the form of few projects set up by corporates whose core business was not power development and their objective to invest was solely to utilize the additional cash available to generate "annuity revenues" and with the industry scaling up and returns getting constrained there, many of them wanted to exit their investment; secondly, of a number of PE funded renewable energy IPPs that were established between

2009 and 2013, while the large players were able to raise fresh equity, the sub 300 MW platforms, not having being able to, preferred consolidation; and thirdly with India emerging to be one of the largest market in renewable energy, a lot of global players have shown interest in the same and have taken M&A as a route to enter the Indian market.

2.3 Financing India's Renewable Energy Targets: Challenges

2.3.1 The Investment Gap: Potential and Expected[35]



Source: Sen et al, "Reaching India's Renewable Energy Targets: The Role of Institutional Investors", December 2016, https://climatepolicyinitiative.org/publication/reaching-indias-renewable-energy-targets-role-institutional-investors/

A Climate Policy Initiative report, "Reaching India's Renewable Energy Targets: The Role of Institutional Investors",[37] spoke of the gap between the potential investment versus the expected investment in the Renewable Energy Sector in India. It went on to say that the highest potential to bridge this gap was through foreign as well as domestic investors. Even though the equity capital from FIIs is slightly more expensive than from the other sources, they have the potential to finance 100% of the equity financing gap. And while the cost of capital from DIIs is highly cost effective, they have the potential of financing 54% of the debt financing gap. An increase in the understanding of the sector may make it an attractive investment for the otherwise risk averse institutional investors.[37]

Banks and NBFCs will also have an important contribution towards investment in this priority sector, as the need of the hour is to invest more in clean and green technology for achieving effectiveness, efficiency and economy.

2.3.2 Cost of Financing

One of the main issues in Financing Renewable Energy is the extreme cost of financing. Unlike Fossil Based Energy Technologies, Renewable Energy Technologies have high Capital costs though the operating costs are low and are usually spread over a period of 25-30 years. Currently the cost of finance ranges between 12-14%.[38] Since cost of finance is a substantial component of the Power tariff, a reduction in the same could bring down the Power Tariffs hence enabling an increase in demand for Renewable Energy. The cost of finance is influenced by multiple factors.

2.3.3 The Risk Perception

Given that the risk perception of the project, reason and identity of the borrower for/of finance is dominant in any form of financing, and specifically in the financing of renewable energy projects, and especially since the lenders differ in their understanding and ease with the same, the associated risk mitigations measures could help in reducing the perception of risk associated with financing the projects.[39] The cost of the debt and the return expectations of investors are dependent on a number of parameters that include project related factors such as operating period, length of construction period, stage of construction, the presence of power purchase agreements, financial health of distribution utilities, and market and economic factors such as the state of economy, risk free rate, inflation expectations, risk weights, type of financing and the like. Financing the sector looks attractive due to factors such as absence of fuel supply issues, shorter gestation periods, and lower operational costs in

comparison to conventional projects. But, there are also a few key risks associated with financing renewable energy projects, predominant among them being the regulatory risk and the continuity of incentives. While there are "mechanisms such as preferential/ feed in tariffs, renewable purchase obligation (RPO), renewable energy certificates (REC), income tax holiday – 80IA benefits, accelerated depreciation (AD), generation based incentive (GBI), duty and tax exemption / concessional duty for imports, etc." that make this sector investment extremely attractive, the challenges of uncertainties in continuity and non-uniformities show a lot of room for improvement.[40]

2.2.4 The Culmination: Financing Challenges in Meeting the Renewable Energy Targets

1. Regulatory/ Policy Risk: Policy changes and implementations contribute significantly to investment trends. The following are the possible challenges:[41]

(a) Regulatory risk and continuity of incentives
(b) Non-uniformity in policy guidelines at central and state levels
(c) Uncertainty and divergence in feed-in tariffs approved by SERCs
(d) Lack of long-term Renewable purchase obligation trajectory and its compliance

2. Economic Risks for Lenders: The key risk here is how much of the returns and by when can the returns be expected considering the timeline of the projects, and considering that the investments are huge; how much risk is the lender/ investor willing to take. Renewable energy projects need huge capital investments, and usually the cost of such investments is higher than the cost of financing of fossil technologies. The concerns and challenges for the investors/ lenders of Finance could be:

(a) Payback Period of the Project (PBP)
(b) Opportunity cost
(c) Return on Investment (ROI)

3. Operational Efficiency: The Operational risks and the project related risks could throw quite a few challenges such as:[42]

(a) Financial losses of distribution utilities and non-payment
(b) Inadequate evacuation and transmission infrastructure
(c) Capacity Utilization Factor (CUF) degradation

4. Inconsistent Power Generation in few Renewable energy technologies in comparison to conventional energy generation directly questions efficiency on

investment. The output of Wind and Solar Photovoltaic is not constant, and especially in the case of wind the output can be very uncertain.[43]

5. Technological Risk: Continuous change in technology with rising technology costs lead to the technological risk in the sector.

6. Public and Societal Concerns: With the need for clean energy and depleting natural resources as the drivers to increased need for investment in renewable and clean energy, the following could hence be the major public and societal concerns:

(a) Land acquisitions
(b) Forest Clearance

3. Epilogue

Renewable energy is the now the key factor to the future of energy, efficiency, ecological balance and economic security. The various benefits of renewable energy include zero fuel, reduced imports and reduced pollution. It has a huge potential to overcoming the future energy crisis and its impacts on the economy and ecology. In this context, India has already embarked on an ambitious path of increasing its renewable energy share in the country's energy mix, having set a target to achieve 175 GW of installed renewable energy capacity by the year 2022. The finance landscape for the renewable energy sector is on the brink of dramatic change. Mechanisms for lowering cost of investments in the sector will help renewable energy supersede other energy technologies. Few recommendations were made to lowering financing cost for the renewable sector as was mentioned in the paper "Enabling Low-cost Financing for Renewable Energy in India", based on their research were Synthesized products, Tax free Bonds, Capital gains tax Bonds, Inflation Free Bonds, Tradable tax credits, Government/Intermediaries Guarantees and Reduction of Sovereign Guarantee Fee.[44]

The initial efforts to install stations and plants capable of generating renewable energy were driven by environmental considerations and climatic changes. With countries striving to fulfill these pledges under the Paris Agreement, they are increasing focus as well as resources on augmenting renewable energy capacity within the country and setting more ambitious targets for the same. The need for scaling up renewable energy sources, be it Solar, Wind, Hydro, Bio energy and others to meet the international climate goals needs huge investments. The challenges in financing in the renewable energy sector can be addressed through various risk-mitigating strategies and techniques, instruments and structured finance mechanisms. The India advantage is that

there is a high renewable energy potential and with new initiatives from the Central and State Governments, India can capture the benefits by increasing and raising the required investments.

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Ramu C.M.*

Natural Gas as a Potential Game Changer in India's Energy Security

Abstract

In the coming decades, natural gas is poised on the brink of gaining increasing salience in meeting international energy demands. As a moot case in point, its share in the global energy basket continues to maintain an upward trajectory vis-à-vis the conventional dominance of coal and oil. The persisting mismatch between the cost-effectiveness and the energy-efficiency, plaguing most renewable energy resources, gives the cleaner, natural gas burning an added advantage as a bridge-fuel. Being a rising power with accentuating economic credentials to speak for, India seems to have actively embraced the growing importance of natural gas. This has translated into efforts aimed at raising the proportion of natural gas in its domestic energy mix. The fact that the country has insufficient conventional hydrocarbon reserves to feed its expanding consumer and industrial base makes it heavily dependent on imports of the conventional hydrocarbons from abroad. Nevertheless, it would be unjust not to mention some of the far-sighted measures being taken to dovetail hydrocarbon imports (particularly natural gas) with a targeted boost in domestic production.

This article attempts to assess the current and prospective role of natural gas in meeting the demands of India's energy security. It seeks to evaluate the potentialities for accelerating natural gas induction in the country's energy mix, with a focus on domestic production as well as imports. By highlighting the challenges confronting the Indian hydrocarbon sector in general and domestic exploration-and-production in particular, this paper makes a critical assessment of the manifold reforms that have been initiated to address this concern. Through a perusal of the major local, regional and global

* **The author** is a Ph.D. Candidate at the Department of Geopolitics and International Relations, Manipal Academy of Higher Education, Karnataka, India.

determinants that shape India's outlook towards natural gas, a modest attempt has been made to try to help in the evolution of a roadmap for the country in terms of transitioning to a largely gas-based economy.

For years since the advent of oil exploration, the natural gas from hydrocarbon reservoirs was either burned away or injected back into the fields to force out oil that ran out of natural pressure. Commercially-optimised extraction of the gas was an overlooked idea not only because of inadequate technology but also because the usability of gas as a significant energy source was not a priority back then. It was only towards the close of the last century that the economic viability of natural gas as a cleaner, safer and efficient energy source was recognised the world over. Being the cleanest burning fossil fuel, it already constitutes, and is touted to play an increasingly vital role in the global energy supply. Perhaps, judging from the world energy outlook for the foreseeable future, natural gas is likely to pervade the global energy consumption mix as the demand for coal and oil begins to peak. With the inevitable delays plaguing the renewable energy industry in terms of bridging the gap between cost and energy efficiency, the era of fossil fuels is likely to persist longer – albeit with better sustainability – provided natural gas acts as the game changer.

India is no stranger to the rising prominence of natural gas in the global energy lexicon. From negotiating import contracts for Liquefied Natural Gas (LNG) with multiple suppliers, Indian decision makers are seriously contemplating transnational gas pipeline projects from gas-rich countries in its proximate neighbourhood. There is a visible, concerted effort from the national oil companies to expand their footprints across a number of onshore and offshore hydrocarbon prospects, even on foreign soil. From what had hitherto been investments confined to the exploration and production of (mostly) equity oil from participating interests abroad, Indian oil majors have over the years, now diversified their portfolio to include significant investments in gas exploration and LNG projects too.

Assessing India's Natural Gas Reserves

India is not a resource-scarce nation per se. But insofar as hydrocarbons are concerned, the consumption rate of petroleum-based by-products and fuels far outweighs the rate of domestic exploration and production. It would be wrong to assume that the country's gas reserves have been optimally exploited. Domestic challenges – ranging from techno-logistical to environmental and sociological – have scourged the progress of oil and gas exploration within the country, since independence. Political expediency and bureaucratic complacency have only added to the woes of a disincentivised domestic exploration campaign.

Of the 26 identified hydrocarbon-bearing sedimentary basins within the country's territorial limits, only seven have been explored – with many lagging behind their target production capacities. This means that almost 75 percent of India's sedimentary reservoirs that are conducive to petroleum formation still remain mostly unexplored, or at the most, partly-explored (GE, 2017).

Since the liberalisation of the Indian economy in the early 1990s, there have been concerted efforts to reform the country's energy sector, particularly the petroleum and natural gas industry. In contemporary times, there appears to be a strong incentive to push for Greenfield and Brownfield investments in the upstream segment of the oil and gas sector. What is pertinent is that the country's rapid economic growth warrants a concrete policy of meeting energy security with a combination of domestically-sourced and imported fuels. India's commitment to the Intended Nationally Determined Contributions (INDCs) declared as part of the 2015 Paris Agreement on Climate Change, further calls for a gradual shift to cleaner forms of energy. This goes in direct conjunction with the need for scaling up the percentage of natural gas in the domestic energy mix. In the course of fulfilling its long-term sustainable energy targets, select policy reforms and business strategies are being considered, with the end result slated to be a rejuvenated and empowered energy sector with an augmented emphasis on natural gas promotion.

Since the inception of hydrocarbon prospecting in independent India, an estimated 69 trillion cubic feet (tcf) of proven and probable conventional gas deposits have been prospected and identified as recoverable. A sizeable chunk of these recoverable reserves await judicious extraction and full-fledged development, with a considerable number of reserves yet to see lucrative production. Apart from the already discovered hydrocarbon reservoirs, more recent geophysical surveys have revealed the existence of recoverable traces of natural gas trapped either in shale rock formations or between coal seams (in the form of shale gas and coal-bed methane gas respectively) (GE, 2017). Much of the domestic oil and gas production had long come from the Bombay/Mumbai High offshore field (discovered in 1974 by the Oil and Natural Gas Corporation) off the north-western coast of India. However, with the oil platform (installed as part of the first phase of field-development) moving past its peak production capacity within a decade and a half since discovery, the declining production from the western offshore is being gradually compensated with new production capacities coming online in the more promising eastern offshore segment (Offshore-technology, 2017). The good news however is that the Bombay High offshore basin has more to offer, and the second phase of field redevelopment

has already been met with some success in the form of a sizeable oil and gas find in close proximity to the existing one (Reuters, 2017).

On top of the continuing efforts to develop ageing and mature fields, new onshore gas prospects – both conventional and from coal beds – are being commissioned and made operational following successful pilot projects by the public sector undertakings (PSUs) and also a few private sector companies, not to mention joint-venture undertakings. Shale gas assessment was carried out on a pilot-basis in many prospective regions, with assistance from the United States Geological Survey (USGS, 2011).

Another important category of identified 'unconventional hydrocarbon basins' falls in the deepwater segment – off (implying offshore) the western and eastern peninsular seaboard – and further off the Andaman island chain. These deepwater basins are found beyond the 400 metres depth range along the continental margins. Nevertheless, the majority of contemporary domestic gas production is met by the offshore segment, with deepwater exploration made increasingly sustainable with the advancements in hydrocarbon engineering and offshore oilfield technology. Complementing these improving prospects offshore are augmented production levels from existing onshore gas fields (Brownfield projects). This is made possible with increasing foreign investments, which facilitated the entry of the latest state-of-the-art cutting-edge technologies. For instance, the last few years have seen an uptick/ upward trend in Brownfield investments targeted at ramping up gas extraction and recovery from mature fields in the traditional producing regions of Assam, Gujarat and Andhra Pradesh; besides having Greenfield investments in hydrocarbon basins in Tripura, Rajasthan and Tamil Nadu (Ministry of Petroleum and Natural Gas, Governmnet of India, 2017).

On the upside, coal-bed methane (CBM) extraction is another fast emerging mode of unconventional gas production in India. For a country blessed with abundant coal deposits (albeit mostly of poor or average grades), technological developments permitting the extraction of methane/natural gas trapped between coal seams have irrefutably come as a breakthrough. Other than CBM, successful pilot projects are signalling the possibility of shale gas extraction from risky, recoverable shale entrapments that are widely disseminated across India's rich alluvial floodplains and adjoining river basins (Ministry of Petroleum and Natural Gas, Governmnet of India, 2017). However, despite the innovations in hydrocarbon exploration harbingered by the arrival of horizontal drilling, it remains to be seen how the fallouts from fracking/hydraulic fracturing (the flagship technique used in shale gas extraction) would potentially impact a

country like India, given its sensitive environmental and demographic constitution.

The Hydrocarbon Majors

Oil India Limited (OIL) and Oil and Natural Gas Corporation Limited (ONGC) are the two premier state-held oil and gas exploration companies (or PSUs) in India. While ONGC is a multinational company in its own right, ONGC Videsh Limited (OVL) is the exclusive overseas arm of the former. These companies are more or less restricted to upstream operations (exploration, production and development) while the bulk of the downstream operations (refining/processing, distribution and marketing) within the country are a monopoly of the other three state-owned giants, namely Indian Oil Corporation Limited (IOCL), Hindustan Petroleum Corporation Limited (HPCL) and Bharat Petroleum Corporation Limited (BPCL). The midstream operations (includes operations ranging from transporting processed and unprocessed petroleum to building and operating the necessary transportation infrastructure such as pipelines) are carried out predominantly by IOCL and Gas Authority of India Limited (GAIL) – the latter being the largest state-owned gas processing and distribution company in India. On the other hand, Indian-origin private companies like Reliance Industries Limited (RIL), Cairn India (a subsidiary of UK-based Cairn Energy), Essar Oil Limited and Tata Petrodyne have over the years made praiseworthy strides in the petroleum business; transcending multiple segments of the industry (India Brand Equity Foundation, 2017).

Within the realm of natural gas, LNG imports have been gaining traction on a scale of greater magnitude in comparison with the envisioned plans to expedite indigenous natural gas extraction and recovery. Petronet LNG Limited – a joint venture-cum-consortium of India's premier state-owned petroleum companies – has over the years evolved into a top-notch company catering exclusively to LNG import operations. Its portfolio ranges from contracting LNG containers to building and operating LNG terminals for gas liquefaction, not to mention regasification terminals for converting the cryogenic (chilled) liquefied gas back to dry gas (Petronet LNG Limited, 2016). Under the stewardship of GAIL and its subsidiary Petronet, India has been seeking to expand its footprint in the global LNG market. This is by virtue of forming joint ventures and consortiums for LNG commerce with other foreign multinationals and national oil companies, in addition to acquiring equity stakes in foreign oil and gas blocks (following the lead of India's most successful overseas oil exploration giant, OVL) (LNG World News Staff, 2016). The latter has garnered sufficient experience in participating in Production Sharing Contracts (PSCs), refers to the legal contract

between the government (the rightful owner of the land and the resource underneath) and contractor (the company) that enables the latter to explore and produce equity oil from working interests held in oil and gas blocks. However, with an added preference for natural gas in the evolving paradigm of India's energy consumption, OVL is slowly expanding its ambit of operations to focus more on exploration and development of natural gas blocks on foreign soil (Patey, 2014, pp. 123-157). Though OIL has not emulated OVL's feats in the overseas component, of late, there is an increasing realisation of the need to set right its dismal record abroad (Oil India Limited, 2014).

With an eye on the shifting sands in energy geopolitics, India's priorities lie in safe and lucrative access to the various sources of natural gas that abound its geostrategic radar. As mentioned previously, a key element here is facilitating its oil companies (most importantly, OVL) in acquiring working interests abroad through PSCs. Secondly, India is simultaneously diversifying its LNG imports by signing lucrative contracts with its traditional suppliers, while at the same time, seeking new suppliers with whom it is negotiating flexible contract options. Furthermore, long-lasting global geo-economic spinoffs from the protracted era of low oil prices have opened the window for buying LNG in the spot market, and incipiently in the speculation-driven futures market. This has given net importers like India a better leverage in negotiating the prices of short-term, medium-term and long-term LNG supply contracts with rising LNG exporters such as Australia and the United States – apart from revamping already existing contracts (in keeping up with the changing contours of the global geo-economic environment) with traditional suppliers like Qatar (Slav, 2017).

Role of Regulatory Regimes: Challenges and Prospects

A significant breakthrough in the petroleum and natural gas sector began with the gradual deregulation of the pricing regime for the hydrocarbon-based fuels. For a long time, the Administered Pricing Mechanism (APM) was the standard modus operandi followed by the government in fixing the price of oil and natural gas. This necessitated the oil and gas marketing companies to sell the product at government-mandated prices to the favoured consumer base, which in the case of gas chiefly constituted the fertiliser industry and the power plants, following which came the less-privileged masses for whom LPG (Liquefied Petroleum Gas) and kerosene were heavily subsidised by the government – in conjunction with the Supreme Court's welfare-centric mandates (Government of India, 2014). Such socialistic measures, though altruistic, nevertheless increased the debt burden on the government by virtue of incessant subsidisation and subsequent liability accrual.

The APM had its own shortcomings that got illustrated in the form of a state-supported stymieing of competition in the hydrocarbon exploration, production and retail/marketing business. The government-approved nomination of specific hydrocarbon blocks to state companies held back the entry of the private sector in the oil exploration business while quota-denominated marketing dissuaded private players from partaking in the downstream segment, which primarily involved distribution and retail. This in turn created debt-burdened public sector giants which had to resort to unrestricted borrowing to make up for their growing capital expenditure and outstanding dividend payments. Unrestricted borrowing by the state companies from commercial banks naturally gave the government a free hand to intervene in the monetary policies of the Reserve Bank of India. As a consequence, these companies were many a times given loans on government-mandated fixed interest rates, further exacerbating the huge pile of bad debt accumulation (*GKToday*, 2015).

The APM was a prime contributor to India's balance of payments crisis that force-started the liberalisation of its economy. Following the liberalisation reforms of the 1990s, the successive governments tried to rid the oil sector of the regulatory clutches of the APM; albeit with partial success. The result was a failure to whittle down the convoluted bureaucratic system built around the agenda of petroleum subsidies. This compounded the acrimony of the state exploration companies, which were unable to optimise the profits from the decade-long era of high oil prices that lasted until mid-2014. Multiple efforts from previous administrations to move towards a market-based pricing regime either got stonewalled or produced only partial results owing to bureaucratic constraints and a lack of political will. Nevertheless, the incumbent administration of Narendra Modi has been exercising concerted efforts at expediting this long-sought transition, and the fruits of these efforts are panning out in the form of nascent reforms in the overall pricing mechanism for hydrocarbon fuels. Needless to say, the government enormously benefited from the sudden fall in global crude oil prices (since mid-2014). A top-down approach is being implemented on the basis of the Hydrocarbon Exploration and Licensing Policy (HELP), coupled with a market-based pricing methodology for the consumer-retailer interface distributed across the country.

With a focus on restructuring the regulatory regime that had hitherto dominated the hydrocarbon sector, the new regime has been designed to transcend the multiple strata of the beams and pillars that make up India's massive petroleum industry. The latest overhaul is designed to trickle down the multiple vertical compartments in the upstream sector – all the way from the award of exploration licenses and production contracts to the pricing of the extracted

hydrocarbons at the well-head. This will eventually help in determining the selling price of these fuels at the various retail outlets and fuel stations spread across the country (Press Information Bureau, Government of India Cabinet, 2016).

The HELP was promulgated keeping in mind the manifold challenges facing India's oil and gas sector. HELP is a modification of the already existing New Exploration and Licensing Policy (NELP). The former was conceived to address the criticisms generated by the latter because the reformatory character of NELP suffered attenuation from inherent limitations rooted at the policy level. Under NELP, the Indian state-owned upstream companies, OIL and ONGC, were no longer to be given preferential treatment in the allocation of exploration blocks. Although the policy formally came into effect in 1999, for many years, it could only be implemented in bits and pieces, and such haphazardly execution was the by-product of political and bureaucratic complications triggered by short-sighted domestic compulsions. Nevertheless, the year 2017 saw the phasing-out of the final vestiges of the APM that had continued to plague the effective implementation of the NELP. The roll-out of the HELP was a concomitant response to the inability of NELP to catapult India's domestic hydrocarbon production to meet the rising energy demand (PTI, 2017).

It is imperative here to understand that the purported objective of HELP is to effect the transformation from a quasi-liberal hydrocarbon regime to a fully-liberalised one. Nevertheless, NELP had its own share of reforms and partial deregulation to speak of; 100 percent Foreign Direct Investment (FDI) had been allowed in the upstream segment with no mandatory participation of state majors in PSCs. The state companies would also have to compete with other Indian private and foreign companies in an open international bidding; and acreage royalties (to be paid to the government) were fixed at 12.5 percent for onshore regions and 10 percent for offshore locations. Furthermore, companies no longer needed to pay an import tariff for machinery (for operations) shipped from abroad; and near-complete autonomy was granted to the Indian private and foreign companies to market the oil and gas in the domestic market which had hitherto been a privilege of the state marketing majors. With regard to PSCs, the same fiscal and contractual terms would apply to every company (regardless of whether it is state-owned or not) that has been awarded a working interest in select blocks – barring the only caveat that the PSCs would nonetheless be structured and customised in consonance with applicable Indian Laws, subject to an India-centric regulatory and jurisdictional framework (Ministry of Petroleum and Natural Gas, Government of India, 2015).

So where did NELP fail to deliver? The simple answer is that most of what was penned on paper was not possible to be put into action on the ground. For one, complications arose from having disparate licensing policies for different hydrocarbon resources and different exploratory blocks (classified into NELP and pre-NELP). So, in the event of an overlapping of the resources between separate contracts, the government is caught off-guard in terms of administering the producer price of the extracted resource. Since the clauses have already been set, there is no window for accommodating unanticipated externalities and cost overruns. Since the PSCs under NELP have relied on the 'profit-sharing' logic for government revenue generation, unless and until the discovery is made, the company just needs to pay the acreage royalties and corporate tax to the government – and not the mineral/resource royalties. (or profits). However, hydrocarbon exploration is a risky business and it generally takes a long time for production to begin; or sometimes, there are cases where no oil (or gas) is struck. Owing to such uncertainties, the governmental polity and the bureaucracy gets inadvertently attuned to a long gestation period, wherein the ruling machinery tends to use its discretionary powers to micromanage the contractor's contractual obligations. This incipient friction could lead to unwarranted delays in the development of the discovered hydrocarbon reserves. Legal disputes would ensue between the contractor and the government, resulting in an environment that is not investor-friendly (Press Information Bureau, Government of India Cabinet, 2017).

The government's share of the profit is normally computed on the basis of a predetermined percentage rate agreed upon during the bidding. Nevertheless, in case of a commercial discovery, the contractor has the right to recover the input costs before sharing the profits with the government. However, if the rate of extraction/production of the resource is below the level estimated by the contractor (during initial prospecting), it can have spill over consequences for the sharing of profits with the government. But the contractor would have already incurred massive expenditures in the exploration phase and the NELP gives it the right to recover these costs regardless of the output rate. It is only during the profit-sharing phase after production that the loopholes in the NELP really start unravelling. The profits would naturally dwindle as the output declines whereas the contractor would still have to pay the government its share on the basis of the already predetermined rates. This results in time-consuming disputes between both the parties, which in turn impacts the stock value of the contractor company and exacerbates investor fear. The protracted legal tussle between the government on the one side and RIL and British Petroleum (BP) on the other, over the issue

of under-productivity from RIL's KG-D6 gas basin, is but one example of the pitfalls associated with the profit-sharing principle (PTI, 2017).

In addition to these, under the NELP, despite the base price of crude oil being pegged to market rates, the price of natural gas was still subject to government approval generally dictated by inflexible parameters articulated in the PSC. Lastly, the royalty rates under NELP do not take into account, or specific detail the topographical classifications within offshore locations, namely shallow, deep and ultra-deep water basins – thus providing a recipe for further complications (Press Information Bureau, Government of India Cabinet, 2016).

The operational challenges faced by the contractors and the government under NELP paved the way for the appointment of two important committees (during Manmohan Singh's second term as Prime Minister) to study and offer solutions to the underlying problems. First, the Rangarajan Committee (RC) in 2012, and then the Kelkar Committee (KC) in 2013, came up respectively with specific sets of recommendations. The RC proposed a revenue-sharing model in place of the pre-existing cost-recovery and profit-sharing one. Accordingly, the government would receive a share of the contractor's resource revenues immediately after the royalty payments are made. The committee batted for shunning the cost-recovery mechanism by appealing to the contractors to improve technological and logistical efficiency, and thereby bring down the cost of exploration and production. The government would in return incentivise the contract terms to enable the contractor a hassle-free operating environment – implying that the former would remain a passive facilitator and not an active stakeholder in operations. It must be borne in mind that the RC based its rationale on the then contemporaneous exorbitant global oil prices. Hence, it believed that the contractor could easily make up for the risk involved in foregoing cost-recovery and could at the same time optimise its oil sales' profits into improving efficiency and enabling cost-effective operations (Government of India, 2014).

However, the following year, debates ensued with regard to the efficacy of relinquishing the cost-recovery and profit-sharing model. Thus, the KC was constituted, specifically with the agenda of chalking out a strategy to bring down the excessive reliance on expensive hydrocarbon imports and scale up domestic production. Emphasis was laid on Brownfield investments aimed at revitalising ageing and mature fields and reverse the trend of stagnating – or otherwise – dwindling production. The KC argued that cost-recovery would be better suited as it had a more lucrative appeal to the contractor who will need to incur additional costs to develop India's ageing fields and enhance resource-recovery. Further, the government's role as passive overseer would be completely

eliminated and the contractor would enjoy the liberty to decide the cost of exploration and production without a governmental imposition of a ceiling. One major recommendation of KC was to provide a window for the government to assess the contractor's computation of the profit share; meanwhile, until the contractor sees an enormous jump in profits earned through sales, government revenue would be confined to receiving royalty payments and corporate tax collection. KC's argument for complete deregulation was based on the logic that the exchequer is committed to pay the highest price for the consumption of a precious commodity that is also a prerogative of the future generations to harness (Coventus Law, 2016).

As for pricing, while RC supported only partial deregulation of prices, KC gave the contractor the freedom to peg producer prices at market rates, giving way to arms-length pricing. RC, although accepting crude oil price deregulation, did not vouch the same for natural gas – since it believed that India was then still in the fledgling stages of injecting natural gas into its energy mix and competition in the gas sector was still nascent. For the same reason, it insisted that the base price of natural gas be computed on the basis of the weighted average of the three major global crude benchmarks. KC on the other hand suggested complete deregulation such that the producer has the freedom to determine selling prices of the extracted commodity. It reinforced the cost-recovery and profit-sharing mechanism which was a hallmark of the Production Sharing Contract (PSC) legacy, whereas the RC had suggested scrapping the PSC model in favour of the Revenue Sharing Contract (RSC) model. Notwithstanding the bold recommendations of both the committees, NELP could not be fully refined as the government itself found the going tough in terms of segregating the terms and conditions for pre-NELP blocks (which were previously nominated by the government to private players, albeit with mandatory participating interest held by either ONGC or OIL) and associated contracts from those contracts negotiated under the NELP regime (Coventus Law, 2016).

The Narendra Modi administration has had to tread carefully through the quandary that was presented by the regulatory regimes, both of the present and the past. Following a thorough reassessment of the situation, a new mechanism was devised– albeit one that tries to toe a fine balance between both committee recommendations. Thus was born the HELP, accompanied by certain unprecedented reforms and fundamental recalibrations to the existing and previous exploration and pricing regimes. Some of the basic parameters of the new regime were synthesised from the recommendations given by the abovementioned committees. Commensurate with the RC findings, the principle

of revenue sharing (RSC) was adopted. Meanwhile, a single uniform licensing policy was introduced that works on the open acreage licensing model. This was a brainchild of the KC. On a similar vein, complete freedom has been granted to the licensee/contractor in terms of marketing and pricing of the oil, while special consideration has been extended to high-risk undertakings such as High Pressure High Temperature (HPHT), Deepwater (DW) and Ultra-deepwater (UDW) finds. However, the freedom to fix gas prices does come with certain restraints, whereby the government would still maintain a price ceiling computed every six months on the basis of thoroughly chalked-out formulas (linked to prices in established global gas hubs) separately for normal discoveries and high-risk ventures. Nevertheless, the complete deregulation of gas prices may be in the offing, as trading in the commodity is expected to gather pace. (Press Information Bureau, Governmnet of India Cabinet, 2016).

The open acreage licensing system espoused by HELP seemingly gives a morale boost to companies that were hitherto willing to invest in Brownfield and Greenfield ventures in India's upstream segment, but were wary of the excess red-tape and governmental oversight. The bellwether for a desirable change in the contractors' attitude could perhaps be the unveiling of the first ever National Data Repository (NDR) by the Union Minister for Petroleum and Natural Gas, Dharmendra Pradhan. The NDR, prepared by the Directorate General of Hydrocarbons (DGH), contains geophysical and seismic data about the various hydrocarbon prospects disseminated across India's 3.14 square kilometres of sedimentary basins. Interested contractors can make use of the NDR and choose basins they wish to explore – be it a producing mature field requiring additional investment, or even, heretofore unexplored regions. The contractor also gets to delineate an area of its preference for exploration, from unlicensed blocks. The chosen areas are put up for auction by the government and the highest bidder (the one offering the highest share of the resource revenue) is awarded the licence for the block (PTI, 2017).

With the transformation from NELP to HELP in the upstream segment, the Indian government is placing its bets on increased foreign investment, particularly in the domain of natural gas extraction and recovery. The essence of such a transition is to hasten the switch to a full-fledged liberal fiscal regime dictated primarily by the market forces of demand and supply. At the same time, one of the immediate priorities has been to add fresh momentum to the operating capacity of the state exploration giants – ONGC and OIL. These upstream companies, along with its (state-held) oil and gas marketing counterparts and transport facilitators have been earmarked for a major revamp. Merger is one of the outstanding plans floated by the government for upgrading

the efficiency of these companies. Correspondingly, the government has announced the possibility of a merger between ONGC and HPCL on the one hand, and OIL and IOCL on the other. The objective is to create world-class vertically integrated hydrocarbon majors that will be able to balance the losses suffered by the upstream segment with the windfalls made by the downstream segment under the persisting era of low oil prices – and vice-versa, as the trend shifts (FE Online, 2017). To further increase the stock value of these publically-listed companies, proposed step-by-step divestment of government-held shares is expected to fetch the desired outcome of reinvigorated public companies financed more on equity and less on debts.

LNG Diplomacy: Transcending Oceans and Terminals

With domestic oil consumption soaring year after year, India's share of net natural gas consumption has however, not maintained a similar trajectory over the last half a decade. (Boersma, et al., 2017). This inconsistency was mainly attributed to depleting domestic production, cost-ineffectiveness and above all, the mismatch between installed power generation capacity and installed transmission-cum-distribution capacity that disincentivised power utilities from buying the expensive gas (Ernst & Young, 2015). Through initiating reformatory legislations in the hydrocarbon sector, the Modi administration has evinced interest in expediting the transition from coal and oil to natural gas. Along with the restructuring of the domestic hydrocarbon industry in the quest for augmented natural gas production, a red-carpet strategy is being modelled with respect to LNG imports. Capitalising on the timely advent of low oil and gas prices, besides banking on the 'fresh blood' injected into the global LNG trade, India has been negotiating lucrative import contracts (and renegotiating previously signed ones) with multiple suppliers (*The Hindu*, 2017). Among these are new and existing contracts that range from 'long-term' in nature, to medium as well as short-term. The price slump has also pushed India to buy LNG in the spot market (ICIS, 2017).

Moreover, some of the long and medium term contracts for which the price was already set, have been renegotiated on account of the low spot prices. Such signs are a clear indication that there is a strong buyer's market for LNG emerging in Asia, with countries like India, China, South Korea and Japan ramping up their imports of the fuel. With never-before-seen volumes of spot LNG cargoes replacing long-term contract-based shipments to India and the Northeast Asian economies (especially as oil prices reached a nadir in 2016), LNG traders are looking to hedge themselves from unexpected price fluctuations. This has harbingered the growth of futures trading contracts for LNG, focusing on the

Asian markets, and lately with a keen eye on India in particular (*LNG World News*, 2017).

Qatar has long enjoyed the privilege of being the world's undisputed LNG export machine. The small Persian Gulf monarchy even managed to reprise its role as a reliable exporter amid the mid-2017 diplomatic standoff with Saudi Arabia and its cohort of nations (Sergie, Inajima, & Dipaola, 2017). Of late, thanks to its booming offshore gas and CBM discoveries, Australian gas exports have surged, as new LNG terminals are going on-stream along its west-to-north-western coast. However, the most formidable long-term challenge to the undisputed export monopoly of Qatar and the invigorated LNG boom in Australia comes from the United States (US). Aided by the domestic shale revolution and the introduction of cost-effective oilfield technologies by companies operating on and off the Gulf of Mexico, the US is on the course to becoming one of the world's leading exporters of LNG. The reversal of the 40year-long moratorium on hydrocarbon exports (by the Barack Obama administration in 2015) has transformed the US' role from that of a net petroleum importer to one of a rising net exporter. To top it off, the 'pro-drilling' policies of the incumbent Donald Trump administration has propelled the United States to the top echelons in terms of domestic gas production. The accentuated vigour in the construction of new gas liquefaction facilities along the Louisiana and Texas coastline is only a natural forerunner of increasing American LNG exports to come by (Kraus, 2017). Apart from the exporting giants, traditional petro-producers like Malaysia, Indonesia and Nigeria have also made decent strides in the LNG export business. Massive gas discoveries off the Eastern Mediterranean in recent times have further pushed countries like Egypt and Israel to consider exporting LNG in a big way (International Gas Union, 2017).

LNG trade has indeed become more cost-effective over the times, and improved technological innovations appear to justify this argument. Nevertheless, the construction of liquefaction and regasification terminals continues to be a relatively, costly and time-consuming process. Whatever cost-minimising technological and logistical progress has been made so far, it has been a result of the surplus windfalls pocketed by the oil companies in the bygone boom-time of oil prices. Notwithstanding the fact that the global oil prices have nose-dived since mid-2014, the price rally over the past few months have seen crude prices rebound to the USD 70 per barrel mark, only to stabilise around the USD 60s. On an average, following the price nadir of early 2016, the oil glut was somewhat counterbalanced by a rallying demand from the Asian economies, coupled with continuing compliance to the oil-production-cuts espoused by Saudi-led Organisation of the Petroleum Exporting Countries

(OPEC) and non-OPEC Russia. Rather than actual per-capita demand being the chief determinant, the driving forces behind this demand surge now are the respective governments (and their petroleum marketing companies) that are opportunistically importing large quantities of cheaper oil and gas to pay off the fuel subsidy burdens accrued over the years of higher prices (Corbeau, Braaksma, Hussin, Yagoto, & Yamamoto, 2014). Though several small oil and gas producers went bust in this short span of time, the bigger and resolute ones were able to absorb the manifold shocks of incessant price fluctuations.

Besides, these producers have gradually got acclimatised to the new highs and lows in crude oil prices. In responding to these new price realities, there is a natural impetus on the part of the producers to reduce their break-even costs by improving operational capabilities. However, one crucial area where gas trumps oil in a big way is the projected rise in long-term demand for the former vis-à-vis the latter. On top of that, with the burgeoning international commerce in dry natural gas and LNG, new pricing benchmarks/indexes are being adopted that de-hyphenate gas prices from global crude oil prices (*The Maritime Executive*, 2017). The over-arching scenario has awakened the conventional natural gas exporters (heretofore relying mainly on dry gas shipments through pipelines) to the growing prominence of LNG. The writing on the wall is that in the upcoming era of natural gas, one will have to complement pipeline shipments with the ocean-faring and longer-distance-covering LNG carriers.

Some optimism may be expected in the way the Modi administration, particularly the Ministry of Petroleum and Natural Gas (MPNG) headed by Dharmendra Pradhan, is taking steps to revitalise India's otherwise more or less stagnating hydrocarbon sector. True that the low oil prices have been a blessing for the government in initiating groundbreaking reforms, and in the meantime, increasing fiscal revenue by maintaining higher taxes on an incontestably polluting commodity.

However, in the long run, in signalling a shift to a gas-based economy, the possibility of a complete deregulation of the domestic gas market exists in the pipeline. As a starting point to this, India plans to establish its very own natural gas hub / trading platform in the near future. However, such a possibility is contingent on a proactive programme of ramping up domestic gas production alongside building a well-integrated transport infrastructure network linking the country's multiple distribution points with its producing fields and LNG import terminals (ET Bureau, 2017). The materialisation of an India-centric gas trading hub is a crucial element in the creation of a regional pricing index that ensures competitive pricing of natural gas in the domestic consumer market.

Once accomplished, this would follow on the lines of established global gas-pricing benchmarks like the US Henry Hub, UK NBP, Average German Import Price cif (Cost Insurance and Freight) and the Japan LNG cif (*The Maritime Executive*, 2017).

Gauging the rising clout of the Asian LNG market, India has also sought to forge mutually-beneficial marketing alliances with fellow importers like Japan. Such an alliance would help ensure maximum flexibility as a net buyer in the booming LNG business. In light of the low LNG spot prices, GAIL of India had already renegotiated the supply contract terms with the oil Super-major Exxon Mobil over shipments from the latter's Gorgon Project in Australia. In return for lowering prices, GAIL agreed to increase the volume of gas it would buy as part of the twenty-year contract. This was followed on the continuing run of success stories as the renegotiation of contract terms between India's Petronet LNG (a subsidiary of GAIL) and Qatar's RasGas (Slav, 2017).

In future, GAIL intends to modify the existing arrangements for LNG imports with US-based companies and Russia's Gazprom too. In the case of the US, there is already an agreement in place between GAIL and Chenerie Energy for LNG shipments from the latter's Sabine Pass terminal in the Gulf Coast. The Indian gas major has also signed up for LNG imports from Dominion Energy's to-be-commissioned Cove Point liquefaction plant (LNG World News Staff, 2017). In addition to imparting amicability to the contract terms, tactful exercise of consumer advantage has brought India and Japan closer in terms of securing more lucrative supply deals and concessions from their respective sellers. As per their understanding, both countries are expected to swap shipments from each other's contracts depending on real time logistical profitability. This will help do away with the 'Destination Restriction Clause' – a stringent caveat underscoring most supply contracts that prevent the buyer from re-exporting the imported volumes to a third party. Such a competitive model will be beneficial to a transparent LNG market and should ease out India's prospects for a regional gas trading exchange based on actual supply and demand (Reuters, 2017).

Transnational Gas Pipelines: A Pipedream or a Reality?

Sourcing gas from outside the sovereign does not stop with maritime LNG commerce. In India's case, the need for a transnational gas pipeline remains a time-tested proposition. In the years that have passed by, three major transnational gas pipeline projects were proposed, which eventually found their way to the doldrums, i.e. they never achieved fruition. These projects are as follows: The IPI (Iran-Pakistan-India), TAPI (Turkmenistan-Afghanistan-Pakistan-India) and the MBI (Myanmar-Bangladesh-India). However, given the momentum in the

transition to a gas-based economy, there is again a strong revival of interest in pursuing these projects, which may or may not come into action.

With a keen eye on the massive Galkynysh (also known as Dauletabad) gas field in Turkmenistan's Amu Darya Basin, India has expressed its commitment to bringing TAPI online. Replete with doubts about the transit of the pipeline through the restive regions of Afghanistan and Pakistan, the daunting question of the times is whether economics will ultimately trump geopolitics. And if so, will the question of energy security see the light of the day? What is path-breaking is the agreement reached between the Afghan government and the Taliban, wherein the latter vowed to safeguard the passage of the pipeline within its strongholds. With the completion of the Turkmenistan portion of the pipeline and the Taliban's commitment to the safe operationalisation of its Afghan section, TAPI may no longer be written off as a pipedream (Alikozai, 2018).

As for IPI, the proposal remained in a state of dormancy for so long, primarily on account of India's apprehensions to the pipeline's transit through Pakistan. Even an alternate proposal to reroute the pipeline through the shallow continental-shelf of Pakistan has not picked up steam. However, hopes of a gas pipeline from Iran has remained in suspended animation with the conception of a second alternative, which is one that traverses the deep seabed of the Arabian Sea between Oman and the western Indian state of Gujarat. This is the proposed Iran-Oman-India Deep-sea gas pipeline project. South Asia Gas Enterprise Private Limited (SAGE), a joint venture between a New Delhi-based logistics firm and UK-based deepwater services-provider, along with a consortium of other multinationals, that have already expressed a fervent interest in undertaking the ambitious project. The project has been officially christened the 'Middle East to India Deepwater Pipeline' (MEIDP) (Press TV, Iran, 2017).

Bereft of the Pakistan-challenge, but replete with logistical challenges, the pipeline, once materialised, will create a new chapter in the South Asian energy security landscape. The MEIDP project would in fact complement any breakthroughs expected from the promising Chabahar Port complex, besides giving some thrust to the proposed multi-modal International North-South Transport Corridor (INSTC) that links India, Iran and Russia via the logistically shortest trade route. Another eventuality that deserves mention is an integrated gas corridor connecting Turkmenistan, Iran and India; given that Iran already imports Turkmen gas via an inbuilt pipeline network. A feeder pipeline is already being constructed to link Chabahar Port with the gas lanes from Turkmenistan. This, coupled with proposed gas swaps between Russia and Iran (via the Caspian Sea or routed through Azerbaijan), could offload more Iranian gas (from its

southern fields) for supply to India through the MEIDP (Vaid, 2016). The crucial US support for TAPI, over an Iranian gas-sourced pipeline project, has created a looming cloud of uncertainty for the latter. Given the threat of US sanctions, major western oil companies and service/technology providers remain cautious about partaking in any venture that boosts Iran's economic leverage in the South Asian region.

The MBI pipeline project has withstood the test of time, going on from 'the pipeline that wasn't', to the 'pipeline that could be'. India had shelved the project, a decade back citing opposition from Bangladesh's then leader Khaleda Zia. However, with Sheikh Hasina in power, India has received an immense morale boost in terms of executing its economic projects that inter alia focuses on the development of its Northeast region. The MBI pipeline may get a second lease of life from the Hydrocarbon Vision 2030 – the MPNG's flagship proposal for bringing economic development in the Northeast using the hydrocarbon sector as an important facilitator (Press Information Bureau, Government of India, 2016). This pipeline, along with the multi-modal Kaladan Transit Transport Project, presents an opportunity before India to make up for the lethargy that had cost it a fruitful energy partnership with resource-rich Myanmar. Where India had once lost its golden opportunity, China seized the prize for itself when it successfully constructed a gas pipeline (supplementing the previously built oil pipeline) from the promising Shwe offshore gas field (Engh, 2016). Perhaps it is time for India to recalibrate its flawed strategies and indulge in some serious energy diplomacy.

Conclusion

India's energy consumption is no doubt rising to exponential levels. For a nation invariably confronted with the challenges of balancing economic growth with social development, guaranteeing energy access to its multifarious population remains a daunting task. While on one side, there is a pressing need to bridge the gap between the rising, gross national energy demand and lagging supply, the flipside necessitates energy penetration and energy integration across the country's diverse geographic landscape with its multiple demographic tiers.

However, development does not strictly entail improving per capita energy consumption, if it does not involve a sustainable approach that promotes growth with less carbon footprints. Unlike coal and oil, as a resource still awaiting optimisation to its promised potential, natural gas fares well as a cleaner fossil fuel that qualifies as a bridgehead in the transition from coal and oil to renewable energy. More pertinently, in the fledgling renewable energy sector, given the problems of erratic power supply, (due to the inconsistent availability of the

energy generation source) and the nascent state of battery-based storage, gas-based power plants are more equipped to make up for any transmission losses during peak hours. This particularly holds true in India's case and hence, an urgent requirement arises to scale up the proportion of natural gas in the energy mix of a country, which is destined for strong growth.

Transcending regressive partisan politics, it must be acknowledged that the enthusiasm shown by the Modi administration in promoting natural gas usage holds India in good stead, both for now and the future. Be it in the areas of indigenous natural gas production, or overseas sourcing, there is a tangible demonstration of a proactive policy that pegs India's energy requirements to optimising gas usage. While foreign investment is crucial to rejuvenating India's ailing hydrocarbon sector, most importantly the upstream segment, India's foreign policy too needs to be calibrated with a streamlined energy diplomacy component. Oil companies need not be lectured on how to negotiate; but the government's pursuit of energy diplomacy could still largely influence the prospects of its oil companies abroad.

Therefore, by extending the required diplomatic support and leverage/ advantage, the Indian administration's overseas energy policy should work in tandem with the interests of its companies. The foremost priority in acquiring equity blocks overseas must be to fulfil India's energy requirements; but the companies ought to be given their basic share of autonomy in negotiating contracts and marketing their produce – an untradeable liberty that enables their maturation into top-notch majors with sufficient international experience. OVL is a classic example of how an Indian exploration major excelled overseas with the right mix of operational and managerial finesse, combined with the unwavering support of the Indian governmental apparatus wherever need be.

To conclude, India must make use of all possible means to raise the volume of gas in its domestic energy basket. The cascading reforms in the natural gas sector are a welcome sign as these are expected to bear fruit with the rising robust demand for the commodity from various sectors of the national economy. The policy-makers will have to walk the tightrope in terms of deciding whether to swiftly go for gas price deregulation or wait until the market attains full maturity with an empowered end-user base. As a matter of fact, there is justification to the subsidies extended towards the fertiliser industry – traditionally the top consumer of natural gas. To elucidate, it plays a substantive role in supporting agriculture as well as the Micro, Medium and Small Enterprises (MSMEs) – which are the mainstay of the unorganised sector that constitutes the backbone of the Indian economy. Said that, in a country with an inbred

penchant for thrift and frugality, and where process-based innovation trumps product-based innovation, natural gas is poised to have a bright future.

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Santosh K. Mishra*

Luck that is Twirling in the Sky: Utility of Drones in the Farming Sector

Abstract

The road to efficiency, efficacy is important for sustainability. It'll take goals, strategies and simulations with techniques to compliment development alternatives. One is the unmanned aerial vehicles (UAVs). Its utilities are many...in resolving logistic objectives to acquire inputs to act and control procedures for desired outcome with depth over distances. It is examined for use in cultivation in developing India situation. Unless, the agricultural wars would reach our door-step that we cannot turn away from. India would rather bargain on a flight plan to UAV and not just make do with a game of leapfrog.

Rural India, silently questions in these stifling times, but alas! ... with no answers. With crops after crops failing, all people are able to do is stare in despair, gaze and may be yawn. Life ultimately ends up upside down. A distressed section of the society wanders as labour, another section turns resentful, still another faction turns party-political, and some end up radical; some even do the unthinkable with their lives. The *Vikash* juggernaut trudges on with a cacophony of: the last remaining Indian village post electrified, a drought loan waiver, an LPG cylinder reaching every household, 'Swachhata' slogans, National Rural Employment Guarantee Act (NREGA), Awash Yojana, skill development, progressive education, cashless transactions and faster, safer internet services, or the National Health Protection Scheme (NHPS) augurs on one hand...but all is obscured with the suffusing gloominess of the farmers.

* **The author** is an alumnus of NIT Rourkela and worked with Ashok Leyland for more than one and a half decade. Currently, he is an independent Chennai-based analyst specializing in automotives, IT services, and technology.

In complete contrast to this harsh reality, is a world transcending the frontiers of science in the form of the autonomous 'man-machines', for example, Sophia, the humanoid world citizen using purely analogue electronics to mimic brain, or the 'cyber-punk' *chaps* in 'Dr Who' (British science-fiction television programme), the movie 'Matrix', or 'Enthiran' or 'Twice Upon A Time'. Other prime examples would be Tesla's self-driving car or Indian Space Research Organization (ISRO's) Polar Satellite Launch Vehicle (PSLV) that positioned one hundred and four satellites in orbit or the clever "Robocleanz", household vacuum cleaner, etc.... We can go on and on since the list is eternal and almost endless. Thus, the moot issue of the root cause or the helplessness of rural India inspires us to discuss the feasibility, advantages and disadvantages of UAV (unmanned aerial vehicle) or in common parlance, the robot 'drone'.

Let us discuss the various sectors that drones (UAVs) have been employed in, over the years, in various different countries:

UAV in Governance

On the farthest brink of complexities, a UAV simplifies the most arduous 'reach and restore' tasks which the 'State' may wish to achieve for the people, or to dive down to the bottom of their resources, or to harness existing reserves, and to apply new methods. Some of the specific geo-spatial conundrums to be discussed and considerations that would be applied to these would hold equally true for similar issues and aspirations in any geographies of the Indian subcontinent or beyond. As an example, let us take the case of Odisha State.

1. Capital City: Bhubaneswar
2. Population: 41,974,218, Area: 155,707 sq. km. (11th and 9th of States respectively; http://www.odisha.gov.in/)
3. No. of districts: 30 (http://oddistricts.nic.in/)
4. No. of blocks: 314 (http://www.nuaodisha.com/BlockInOdisha.aspx)

As with any of Indian state, the scope is as follows:

(i) Odisha mineral geographical, territorial probe and surveillance;

(ii) Fisheries research and natural disaster intervention;

(iii) Forestry: poaching or dangerous activities prevention, anti-arms-smuggling;

(iv) Farming and agricultural researching;

(v) Tracking and action for urban security, pollution, land, mines, ports, buildings, villages, mobs, traffics, deluges, fires, airstreams, riot or epidemic vectors…the actual list just keeps getting longer.

In all this, the scope is to tie up broken systems with UAV's; the authorities must be conveyed its essence, moot proposal, and pursue the matter for implementing it in the state.

The Farming and Agricultural Domain

Let us consider the profile of Odisha:

1. Taking arable land as 50%, and 30% population making a living on agriculture; infer that in 314 blocks, 155,707 sq. km. and 41.97 million population; per block, 250 sq. kms farming land exists for the 40,000 reliant population.
2. Then removing 75% as aged and child labour or allowing for some sex divides, per block the land will be 250 sq. kms and the population will be 10,000 as adults in farming or related vocations.
3. Out of 250 sq. kms block, if one forms ten 25 sq. kms farms with a 1,000 headcount each…we can count 500 owners (big or small) and land labourers…by fair dice.
4. The result: the number of such farms in Odisha state would equal about 3,000. They can easily operate with modern practices...and of course, UAV assisted management. (to be covered in detail further on in this article).
5. Account ownership (and allow trading among owners) in the form of demat shares. The profit sharing should be between all concerned parties;- salaried employments, job wages or casual hires, or a mix of all.
6. Livestock, meat and dairy or future pursuits can be thrown in, in tune with the farm economics. Farms can even start developing new dwellings. This will transform the landscape of the State, make breaking news in all media. Motto will be #Multiply.Gains.and.Save.Resources, #new.Beginnings, #new.Trials.And.Research, #go.Green, #marketing. Success, #Profits, and #race.for.Excellence

Agriculture is Our Worth

India's population heft has flourished beyond 1.25 billion; India and China make 40% of world humanity. We are the amazing, human resource, pools or unfathomable, consumer oceans. A populous nation would, and can, upscale to a mighty agricultural base and then be the provider for other nations. In conjecture, after cold-wars or cyber wars, will agricultural wars be unleashed? (Now that is a thought that can be spooky!)

Contemporary drifts are about sustainability, indicating that the:

(1) State will need to double the agricultural produce for purging hunger (captive consumption) as well as for selling abroad;

(2) State will have to do so with an aim to elevate farmers' status to full potential in a decade or less;

(3) They will have to do this, while optimally using, reusing, reserving resources and heeding that the environment is not approaching its sunset; and

(4) This all whilst facing the global warming's hostile impacts, crop diseases or farming deficits that will continue to be on the upsurge.

United we stand; farmers can fulfil most of their dreams with collective farming. Herein the stakeholders will be state, institutions, activists, and people – all performing their individual roles, and yet there will be a big void, which would actually prove easy to close, by the UAV!

How can the UAVs Help Rural India, Particularly in the Farming Sector?

(1) Soil and field early analysis and life-stage managing:

  (a) Mapping precisely in 2D imagery/ 3-D modelling of landscape & soil at the start of crop cycle

  (b) Planning the seed,

  (c) Planting patterns

  (d) After-planting management (e.g. of nitrogen-level, dampness).

  (Result: Taking software and knowledge inputs, assigning crops area wise, shrewd planning of land and water, fertilizer usage, and so on)

(2) *Crop imbedding*: Shoot pods with seeds and nutrients directly in to the ground by drone-based planting systems reliably with above 75% GPS accuracy.

  (Result: achieves a higher uptake rate against the prevailing fifty-fifty or even less, is efficiently done, saves on human effort, avoids overkill or lop-sided planting, optimizes nutrients, and thus sustains life: "Saves time and cost resources by up to 85%".

(3) *Crop spraying*: Scans the area and sprays correct quantity of fertilizer, and pesticide uniformly.

  (Results: even coverage, higher efficiency, aerial spraying multiple times faster than with traditional labour or ground equipment or machinery.)

(4) *Crop nursing*: Provides animations (time-series analysis) to show the precise growth of crop. Also provides thermal signature insights for areas with insufficient soil moisture or areas having excess water-pooling. This would in turn help improving quality of crop by timely intervention.

(Result: Reveals production failings and enables effective crop management by removing the human errors of monitoring ineptitude and challenges of farming which get even more magnified than ever in more unpredictable weather disorders. Also leads to optimization of the water supply, preventing not just floods but also droughts. (and ultimately yields healthy crops)

(5) *Crop health*: Identifies parts of the field that are dry or need improvements: RGB imagery or from analyzing reflection of visible light and NIR (Near InfraRed) or displaying the heat signature the crop emits, by HD or hyper-spectral, multi-spectral, or thermal sensors present on the drone, signifying the relative density and health of the crop.

(Result: helps in tracking overall health of the crop, normalized difference vegetation indices (NDVI), spotting bacterial or fungal infections in plants or crops in initial stages to indicate action that can save an entire orchard or a crop, and optimizing irrigation, minimizing chemicals seeping in to the earth for preservation of ground water.)

(6) *Crop failure analysis*: In case of failure of crop, an analysis will be available to the farmer and also accessible to the insurance agency to efficiently process and pay for losses.

(7) *Others*: Developing fields, roads, water ways, Checking farm properties, e.g. irrigation systems and pivots, Scaring away birds and pests, Monitoring cattle, livestock and tracing on large properties, Roofs, silo, fences, gates and dam inspections

And so, uptake from UAV would finally be wealth of large quantities of valuable data, easy aggregation of the same, with facilitated analysis, and modelling improvements. So basically, a research and future-safe, clever work culture.

Oops…the optimized water angle! Can it spin…a Mahanadi water war or a Kaveri water war out off our agenda?

Then and Now

In western farms traditional scanning of fields used large sensors and manned aircraft in advanced sector at funds prohibitive for general medium farms. It

now employs small multispectral imaging sensors on small economical UAV which has enabled a much more precise view of the farm and resulted more effective managing and maximized ability to plan, e.g. where and how crops should be planted.

Heavy item, e.g. fertilizer or pesticides reconnaissance for of the entire crop is done with cost and time saving by autonomous UAV deployment than with operating a vehicle and lifting items manually or machinery for carrying and delivering.

Added benefits are livestock management, as can count and monitor livestock for any missing animals, any giving birth, any injured in a herd, or any under an attack and in need of help, etc.

So, where and how many users may be of these modern aerial tools or may or not be contemplating it? Do they self-operate or are third parties acting? Which drones are popular? What more is in industry?

Measuring Vegetation (VIS-NIR-RE Spectroscopy)

Normalized Difference Vegetation Index (NDVI)

By the action of photosynthesis, leaf chlorophyll intensely absorbs incumbent 'visible' sunlight (VIS) that is emitting green, from 0.4 to 0.712 μm wave bands. And, the leaf cell strongly reflects NIR or 'near-infrared' which is from 0.712 to 1.1 μm bands.

Detectors on a 'Landsat' or any other UAV can sense the intensity of both reflectances coming off a vegetation or a part of it in a landscape and calculate NDVI for it as the difference over sum, and form an NDVI image of the distribution. NDVI = (NIR - VIS)/ (NIR + VIS)

Normalized Difference Red-Edge Index (NDRE): Substituting NDVI's visual band with NDRE's red edge band (0.674 μm -0.712 μm bands) is to balance out for an even more overwhelming chlorophyll saturation response to the visual light spectrum, particularly in mid to advanced grown crops or such plants or a large area crop land where visual light absorption is maximum at just the topmost layers of vegetation.

The normalized difference formula, using the ratio of 'Near-Infrared' and the 'edge of Red' bands is: NDRE = (NIR - RE)/ (NIR + RE).[1]

Distinctive Thermal Signature

The soil dehydrates differentially, forming a distribution of moisture and heat that is absorbed/radiated. The water deficient (or diseased crop) portion is

warmer and a high resolution infrared detector depicts this distribution as blue for high moisture and red-yellows for drier parts.

Also, a combination of visible, NIR, and thermal bands' sensors can pick up both water deficiency and the stress on the crops in the fields. Other important sensors are passive microwave, and radar for soil moisture and active microwave for vegetation.[2]

Scanning for resolution: NDVI or NDRE index or surface temperature interplay may be mapped over a land area pixel which is 1 sq. km or more and it can be at sub-pixel levels too through changing flying height.

It is obvious that, for vegetation health, NDVI or NDRE or thermal reference score is 'the more the better'. Using the imagery is akin to sending crop under MRI at scan centre.

What else can we measure…Soil salinity, Insect armies?

Drones in the Field?

In December 2017 'The Farm Journal Plus' pulse poll had published that: 33% USA farmers confirm using drones themselves or through a third party and 31% others were mulling over whether to use it, with approximately 37% saying 'No' (N = 1092).[3]

- DJI (Dà-Jiâng Innovations, Guangdong) when launching the first agricultural drone had assessed in 2016, a $ 75 million future market.
- Global Markets Insights Inc. place Commercial Drones sold in 2016 as over 100,000 units at > $ 2 billion, growth increasing by 25% CAGR and to hit $17billion by 2024.[4]
- National Oceanic and Atmospheric Administration's (NOAA) AVHRR (advanced very-high-resolution radiometer) is a radiation-detection imager for measuring reflectance from the Earth in five spectral bands with six detectors and can quantify the photosynthetic capacity of the vegetation in a given pixel.[5]
- DJI MG 15 has a precision flight, which provides ground sensing, nozzles substituting for more optimal spraying, and intelligent operation planning.
- PHANTOM 4 Pro Deluxe is a clip-on NDVI sensor kit for a consumer drone, with FIELDAGENT software by Sentera.
- FIELDAGENT by Sentera makes ortho-mosaic maps, conveys NDVI and NDRE insights, collaborates with John Deere Centre (MyJohnDeere.com)

On *MyJohnDeere.com* is the Operations Center, a central location to connect agricultural machines, operators and fields.

- DJI M100 is a drone with all kinds of possibilities of customization in mind, for multiple camera sensors and battery payloads, with MICASENSE.
- MICASENSE as a sensor with analytics is capable of making chlorophyll and weed detection maps, time series maps, digital surface models (DSM), and reports disease or stress variation easily.
- DJI ZENMUSE XT is capable of spotting crop stress or disease, tracks fertilizer, monitors trends over time and tracks livestock; it also offers GOPRO flying software, and can integrate with Skymatics, Aglytix and John Deere agriculture management software.
- SKYMATICS is an aerial mapping, inspection, and data analysis service. SKYCLAIM is a fully scalable image analysis service using advanced learning algorithm that provides crop loss analysis after weather strikes hard.
- AGLYTIX intervenes in the agricultural supply chain for quality, production, cost saving opportunities, safety and sustainability practices at the field level. It generates solvers and crunches them using big data of multiple sources to detect, locate, quantify, predict, and diagnose crop issues. AGLYTIX STAND ANALYSIS also determines gaps in the field with RGB imagery, provides an economic impact report, and a shape file with gap severity and location
- FARMLENS is an app for data processing and analytics with basic as well as pro features.
- AGRIBOTIX is another package, which integrates with many devices, and services.
- DRONEDEPLOY app: brings UAV flying to our mobile touch-screens.
- INTERDRONEs made a landing in Las Vegas in 2017 September (International Drone Conference and Exposition which was the landmark commercial drone conference, which gathered more than 3,500 UAV professionals for three days of intensive training, and exhibiting boundary pushing hardware….)

So far, however, this only scrapes the tip of an ice-berg, but it is hefty cool step towards progress. Hip Hip Hurrah!

UAV, Who?

Why is it looking a little sinister down here? Where do we go, India inc.? To our villagers with survey questionnaires, asking our farmers directly from the field?

When we enter the keywords #UAVdrones, #dronesInIndia, #Agricultural Drones, #FlyingDronesLegal, etc in our net browsers however, we discover that our Army used UAV's back in the unrest of Kargil in 1999, and they were used by movie makers, even earlier. Mumbai's Francesco's Pizzeria launched a pizza drone in 2013, delivering the pie to the owner's 'friends'… thus technically "not doing a commercial transaction" in order to sidestep the stipulation for regulation of no commercial use. "Social Drones" in Uttarakhand were the #breaking news, being used in disaster relief after the 2013 flooding. 'Airpix drone' photography was even used in a campaign to rebuild Uttarakhand.

'Garuda Robotics' was started by a 20-year old college drop-out (Pulkit Jaiswal), who produces software to gather and analyze the data that is collected. 'Edall Systems' provides engineering, design and manufacturing services, as well as drone development, and training programs for students and professionals. 'Idea Forge's' *Netra UAV* is a surveillance quad-copter, used primarily by CRPF and UP Special Task Force. 'Aurora Integrated Systems'' *Urban View*, a lightweight reconnaissance drone, and *Altius MK-II*, a medium-range, medium-altitude autonomous vehicle used for surveillance, target acquisition or reconnaissance, are provided to DRDO as well as directly to the Indian Army.

The mushrooming Indian drone start-ups are:

Aarav Unmanned Systems
Aerialair.in
Aerizone Creative Labs
Aerotheo.com
Airpix
Aurora Integrated Systems
Edall Systems
IdeaForge
Kadet Defence Systems
MUAV Drones India
Om UAV Systems
Phenix Drones
Pixeldo

Qubercomm Technologies
Quidich Innovation Labs
SenseHawk
Skylark Drones
Sree Sai Aerotech Innovations
WeDoSky

… Also some other new ones and they have stories to tell. Chinese toy drones are also sold freely in Indian cities and online stores.

Guidelines and/or Policies Regarding Drone Usage in India

The world over, innovative ways surfaced to regulate drone usage. Japan police used drones with nets to trap punk drones. The Netherlands police got eagles to seize rogue drones. The US Federal Aviation Administration requires drones to get GPS ID registered and the user to register with the agency for remote pilot certificate.

In India, no regulations, policies or guidelines exist for civilian drones. The capital police actually chased down all drones for the 69th Republic Day parade after an unusual drone was spotted over the airport. Again, paradoxically, they did it with assistance from their own drone. In Mumbai, a monthly police newsletter against using drones has become the norm, after a 2015 drone sighting over the atomic research centre. In 2016, a tourist at Khajuraho was detained for a drone photo-shoot without any permission...but whose permission? (from the authorities?... but which body was to be classified as the correct authority for a drone misdemeanour?)

So, now, the Indian government November 2017 draft UAV rules have been proposed, to stipulate for the following:

(i) UIN (RFID SIM);
(ii) collision-warning light;
(iii) Unmanned Aircraft Operator Permit (UAOP);
(iv) training;
(v) insurance;
(vi) clearances; and
(vii) a security program (to fly back if malfunctioned).

Going forth:

#1: Categorization: Nano, micro, mini, small and large drone, 5 types from 0-150 kgs.

#2: Nano, the sub 250 g, won't require any security clearance.

#3: It can be used for photography, medical uses, ad film making, e-commerce … etc.

#4: flying above 200 ft or within '500 m' from airport and coast line, restricted.

#5: Except Nano other types will require clearances from various departments.

#6: Drones <2 kg flying within 200 m radius can fly after registered, without further clearance.

#7: Strict privacy norms and approved route to be complied. Mobile flying platform barred.[6]

Minister of State for Civil Aviation Jayant Sinha said in the April 2018 at the Indo-French, Defense and Aerospace Cooperation meet, "Why don't India and France take up the leadership as far as drones are concerned where standards, technology, control parameters have to be harmonised and perhaps create international drone alliance…." Former Union Minister for Civil Aviation P. Ashok Gajapathi Raju had also told in November 2017 that, "Drones would be massively used for improving agriculture and exploring oil and gas all over the country". So, one can surmise that the drone rules are more than welcome.

Who Knows What the Future Holds?

Drones may pervade the skies and swell, and become available for farmers to buy. Moreover, this cannot be classified as toying.... Our agricultural production should be doubled by cutting costs from significant factors…that is done by UAV…the pluses to eclipse the minuses. When a farm would get a drone, it should be more about knowledge and skills, and using it safely and effectively. Then, what is the role of the state or other institutions in all this? It should be towards taking technology to the base of the pyramid, isn't it? Surely, the list should instead go by:

(1) Providing or subsidizing and regulating the drones

(2) Training agriculturists, people

(3) Evaluation and research for more yields, reduced costs

(4) Provide crop insurance, digital market place

(5) Creating new tech, new licensing, monitoring, training, research jobs

(6) Drone specialty in institutions, training centres

(7) More earnings, more profits. More profits will look whopping big on a blue chip.

So be it! Is it likely to stimulate action of the authorities? Reiterating the Odisha case, we can make 3000 of '25 sq. km' farms. 800-1000 of proud men and women owners and workers, would constitute the farm, and form a board. The farm could flourish with crops, animals, aviary, plantations, roads, landscapes, water ways, a drone landing strip, barns, composting stations, RO, equipment, warehouses, a training academies, hospitable cottages, possibly even an elderly home with congenial amenities…and cultivate the phenomenon of "a name that shines and inspires...." All this and more is theirs! Jobs will be in all possible fields: of crops, livestock, construction, operations, marketing or evolve some more job titles. Serious professionals will be at work.

A New Way

Farming will be around the UAV marvel. With or without state it is likely to see tremendous success or end up being a charade. Technology is capable of retiring today's equipment before one can realize; it is so technical that one can check out for more all the time. And it's about employing future-safe, enduring technology.[7] Some basics to keep in mind, regarding this new way are:

1. UAV size, payload, battery pack, altitude, overlap, spin rate, winds, etc will limit the number of passes, flying time, coverage, etc.
2. Quad, hexa or octo-copters have 4, 6 or 8 rotors each.
3. A Quadcopter with one rotor defunct, may questionably come down like a rock but then, so will the others, right? or has it changed?
4. On one charge, image scanning may cover 75-100 acres (0.5 sq. kms) in 30-60 minutes.
5. LiPo batteries may survive for 300 charge cycles, and NiMh batteries, much more

After having loaded flight plan through PC or smartphone and a UAV armed, it's to flying auto or step out monitoring it, shooting images…and doing prodigious farming.

How to Arm the Farm?

1. What drones are to be included in the fleet?
2. Where to buy them, get services related to them, and/or related licenses?
3. How to get financing for investing in them or the funds?
4. What will be the registration, operations, safety, enforcement, and possible dispute chores?

5. Which special drones can be borrowed specifically by the farms, and how often?
6. How to improve constructions and layout, and create more activities related to *arming the farming*?
7. How to aim for improved management, by using the strategy of success recognitions, and achievement rewards?
8. Who would be the partners for analytics, planning and services? and Why?
9. What are the department's targets, development modelling plans, and benefits or risks which exist in the project, and Why?

Specialists will consider farm, size, activities, targets, time-lines and resolve, as well as optimize.

State Role – Pinocchio Test

1. Hard-hitting on state exchequer? Whereas recurring relief and waivers are bad, allowing UAVs, State will make the difference – it's not sops. State can this way control agricultural income too.
2. Did 'The Farm Journal Plus' have only 33% Americans using it? It showed other 31% actively considering it. Anyway, USA land reforms and challenges differ. India's crashing agriculture and brimming population is why India should take the plunge right away.
3. Will the Cooperatives break? State has great responsibility in setting up of the cooperatives, listing of scrips, promoting and regulating; timely helping for seeds, nutrients, pesticides; marketing logistics, insurance etc.
4. State can't entangle much? It is a duty: the state should work with the farms, supply or lease drones, and position the agronomists. The Corporates under CSR should adopt a district or some blocks. Institutions should lead technical incubation.
5. Will the Drones take away/ decrease human employment/ jobs?

   This is lame. The drones will collect and resolve big data, and let humans do what they do better which is decision-making. The drones will deliver fast on a large scale, bring accuracy, resolve tedious logistics and people will ofcourse supervise it. Instead of decreasing employment, new specializations and technological openings or services will surface. All the while, it will produce more to feed more mouths; earn more for farmers and they will have much more time to live normal lives or can even have more holidays.

6. Let go and why fret (*jaane bhi do*?) On the course of crops failing, malaises booming, with no positive action further, multitudes will ignore that life is a one-time gift. It can bring hunger to epidemics.

Waiting for the agricultural wars' advent at our door-step, that we cannot turn away, will prove to be too late. India would rather bargain on a flight plan to UAVs and not just make do with a game of leapfrog.

Notes

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Gopa Bhardwaj*
Devapriya Sanyal**

Deconstructing Gender Stereotypes in 'Mardaani' – A Film from Bollywood

Abstract

In the present paper, the authors analyze gender stereotypes in the Bollywood film Mardaani. It is argued that in Mardaani, Rani Mukherjee's character is a representation of the 'rarest of the rare'; hence she cannot be considered to be a role model for the typical Indian woman. While the film claims to show women empowerment; (a casual first watch may show that) however there are some intelligence and competence parameter stereotypes that fall short. The authors examine them through Rudman and Glick's 'theory of backlash' which states that women are discriminated against, because they lack typical male virtues of logic, assertiveness etc. On the other hand, women who display male traits are not considered communal enough. But in this film, inspite of Shivani (Rani Mukherjee's character) displaying male traits, she is discriminated against. The authors also look at how an identity is constructed specifically for males and females. Male identity is constructed on prized power while the formation of the self is based on meaningless power. Our question is: Do women have to adopt an artificial image so that their identity becomes powerful enough?

It is a truism that the 'contemporary binary of gender translates any fractures of masculinity into effeminization' (Najmabadi 2006: 14), however, the reverse is true as well, any female displaying qualities otherwise attributed to males is in the danger of being called masculine. And *Mardaani,* the film is no exception.

* **Gopa Bhardwaj** is former Professor, Head and Dean University of Delhi and Galgotias University, India.

** **Devapriya Sanyal** is an Assistant Professor at the Galgotias University, India.

If we fall into the trap of calling the film or the characterization of the woman protagonist as progressive (which one is bound to, after a casual first watch) our understanding or analysis of the film then will be only half-baked. Hence, the trick lies in unravelling the loose ends or in exposing the gender stereotype operating within the framework of Hindi cinema.

"Women who are societally subordinate to men, are stereotyped as being nicer" (Eagly and Mladinic 1989) which is all too evident in the way women are represented in Hindi cinema. In this case, however, Rani Mukherjee's character Shivani is not portrayed as being subordinate to her husband nor to the men she works with. She is also not stereotyped as nice, as compared to other characters she has portrayed earlier in Bollywood, in which she is mostly seen as the object of desire for the heroes. In fact in *Mardaani*, she comes across as most businesslike, wholly devoted to her work and almost displays a fanatic zeal and dogmatic determination (like a man) in capturing and punishing the offender. Normally heroines act as sidekicks, at best the romantic interest of the hero and in no way help drive the narrative forward. Their only function in the films is to look good and give voyeuristic pleasure to their audience. Although Mulvey's theorization on fetishism and voyeurism by the film audience may seem dated in the new millennium, one still finds it relevant enough, and especially applicable to the representation of women in Bollywood. By giving Rani Mukherjee such attributes, the director is stereotyping her and associating her with the notion of the 'rarest of the rare' so that she cannot prove to be a role model to the Indian woman.

Earlier narratives have focused on other aspects of femininity which we argue are stereotypes, especially when women are fitted into neat categories and binaries of good/bad, virgin/vamp etc. In this paper, we argue that Rani Mukherjee's characterization too is a stereotyped one – that which falls under the binary of gender – a woman can only be evaluated with man as the touchstone.

From politics to films, women are everywhere. While all this may be seen as an index of women's success it could well prove to be problematic especially when situating woman in a specific context or space. As Tharu and Niranjana argue, some of the initiatives of the women's movement is actually appropriated and annexed by the powers that be, to deflect the initiative. 'Possibilities of alliances with other subaltern forces (*Dalits* for example) that are opening up in civil society are often blocked and feminists find themselves drawn into disturbing configurations within the dominant culture.' (Tharu and Niranjana 1994: 495)

Our paper looks at these disturbing configurations in a form such as popular commercial cinema. While there were protests, which were held against universalisms of various kinds which destroyed the category of feminism, a form such as cinema, which is so influential, is hard at work portraying gender stereotypes. In our paper we analyze gender stereotype via the film *Mardaani*. We will also demonstrate how pervasive mechanisms of subjugation operates below the surface and how processes of 'othering' function in relation to women.

The very title of the film *Mardaani* is problematic. A woman who displays rationality, the ability to judge, assertiveness, quick thinking, etc. usually ascribed to males is known as 'mardangi' and its female version is mardaani. On the other hand, the word 'janaani' as used in local language is taken as derogatory. In short, there is no word other than 'mardaani' to describe the category of women who do not possess feminine characteristics ascribed to them by society. Implicit beliefs interpret perceptions of males and females from the moment they are born. Newborn sons are judged as larger, stronger, firmer and more alert than the newborn; daughters-though the objective measures reveal no differences. The same perceptions carry through the schools and work life. The films not only carry but strengthen such images.

Assertive Women and Feminine Men

It is usually the norm that whenever women become dominant or assertive they are likely to get a husband in a 'feminine' garb and this film too is no exception, even though the director would have us believe that he has in fact made a feminist film, but scratch beneath the surface a little and the whole claim comes apart. From the society's perspective men's solutions are seen as being more logical or acceptable (Taylor and Deaux 1975; Sterling and Own 1982) than identical solutions for and by women. Women who succeed academically or in other high-status careers are seen as less successful in romance and marriage. To be successful, traditionally, a woman needs external authoritative validation of the woman's excellence. To add insult to injury, is the process where inferences and perceptions make evidence more consistent with prior beliefs, including gender beliefs. These inferences automatically fill in the gaps in the actual evidence and enable the audience to make sense of incoming information. As the stereotypes operate pre-consciously we are unaware of their influence; we tend to attribute our perceptions and judgments to other socially plausible factors in the evidence. Rudman and Glick (2001: 743) in their article, 'Prescriptive Gender Stereotypes and Backlash Toward Agentic Women' state, 'Agentic women are viewed as socially deficient, compared with identically presented men'. Due to such stereotypes associated

with intelligence and competence stereotypes, attributions of success and failure at intellectual tasks depend on whether the actor is male or female.

Construction of the self is totally socialized and favours the male and this is reflected in the formation of the norm. While prized power contributes towards the building of the male self, meaningless power gets tagged in the self of the woman. In *Mardaani,* Shivani Shivaji Roy gets the prized power but she has to sacrifice a lot in order to hold onto that power. The orphan girl Pyaari she loves loses one of her fingers and her husband Bikram is humiliated in public by having his face blackened and made to wear a garland of shoes while his clinic is systematically dismantled by the goons in the villain's pay so that she stops pursuing him. She can only watch helplessly and later look guilty as Bikram continues to cry and express his anger at her.

Here too a role reversal of sorts takes place. It is usually a male who is called upon to defend the honour of a woman, due to the manly attributes, which he possesses and by which only he can avenge if any wrong is done to the woman. In this film, however in continuance with the stereotype it is the male who acts helpless and needs to be rescued by the female. Later, as the narrative unfolds, the villain cuts off a finger off Pyaari to teach Shivani a lesson. As Shivani breaks down, Bikram her husband consoles her by saying, "Do whatever it takes you to get him. Don't let him get away." Such scenes only contribute to the idea along with the firm establishment in cognition that in order to hold onto the position of prized power a woman may have to undergo a castration of sorts, we choose to call it female psychological or mental castration, for want of a better term.

The husband figures in this film in a passive role and the evidences abound in the film. For a long time into the narrative, we really don't know whether he is a house husband, as no one mentions him working; also, as we get introduced to the protagonist Shivani we see the camera slowly come to rest on the nameplate at their house which reads 'Shivani and Dr Bikram Roy'. From almost the very beginning Shivani dominates the film. She is first seen in a police jeep in the front seat, usually the prerogative of males and the language she employs is also typically masculine – *Aaj joint ACP Sir ka mood bahut kharaab tha. Sab ka spare part jaam karke rakkhe theh*, (The Joint ACP was in a foul mood today, he was especially nasty today.) …*Yaha kya chootiya pachal raha hai?*, (What the hell is going on here?) … *Jafar itne din police mein naukri karke kya ukhara? Ghanta?*, (You have achieved nothing in spite of working in the Police Force for a long time.) '*Tum log police ko jitna chootiya samaj ke rakkhe ho na utni hai nehi*', (What do you take the Police for?) *Subah uthke Katyal kya karta*

hai se le ke raat ko kisko bajata hai sab khabar chahiye mujhe. (I want to know everything about Katyal's lifestyle.) Her body language is typically unfeminine as well. Apart from addressing her as 'Maam' which is a social marker for a woman, for her biological sex, the men working with her treat her as one of their own. She too displays a comfortable body language while with them.

There are far more frames depicting office space as opposed to domestic ones in this film as well. There are also no other female officers used as a counterpoint in the mise-en-scene. Shivani comes home late from work (she is depicted as a workaholic), and her colleagues have to literally ask her to leave office on numerous occasions, *Mam, aap ghar jao, Meera ne aap ko ghar jaldi aneh ke liye kaha tha na?*…. (Madam, please go home, Meera had asked you to go home early, remember?) There are at least two shots which portray her husband and niece having fallen asleep while waiting for her to get back home. What is interesting is the way the husband is framed in a sleeping position-typical of that of wives having fallen asleep while waiting for their husbands to come home from work as depicted in films. The role reversal creates a sense that the husbands will have to be in feminine state if a woman acquires the male (*mard*) power. What a paradoxical situation for the *sati-savitri nari* – the most prized icon in the Indian society.

While the child Pyaari goes missing, Shivani acts unaffected, going about her business as usual, and even suggesting that her niece to get a haircut from a posh salon in Bandra at which her niece chides her, "How can you act so normal *Maushi*? Pyaari is missing for seven days, and we are behaving as if nothing has happened" thus stripping the woman of all the aspects usually associated with her gender – those of tenderness, affection, soft heartedness, possessing a motherly instinct etc. Here Shivani is made to lose all forms of human touch, which is so very important in both males as well as females, but the demands of her job is such that the female has to abandon the womanly touch and instead become "professional" and act like a man. For her, all this turns into a negative and there is social backlash.

Shivani appears almost mechanical to her audience with her niece's admonishment of her attitude. It is also through her costumes that the director stereotypes her. She does not wear any feminine attire at home either, even if she wears a 'saree' it is only to playact during the raid. The clothes she wears at home too appear to be an extension of her work clothes-the same blacks, browns, or greys or denims. She wears no jewellery, there is also no trace of make-up on her face. The work-life balance is not represented well here, for instance why can't Shivani be a good wife along with being a good police officer as well?

Shivani comes home late at night from work on many occasions, apologizes to the husband for coming home late while he is already there, posing like a good wife, waiting for them to have dinner together. The only exception is perhaps the birthday party to which she comes back home (her guests being her husband and niece who have fallen asleep) in which they smear cake on each other's face and the only time in the film in which she appears almost human in her emotions. This is to perhaps emphasize the dominant role that work plays in her life. In one instance, she even leaves for work after dinner since it is related to investigating Katyal in connection with the missing Pyaari. The husband silently looks at the watch, surprised at the lateness of the hour but does not say anything.

Perhaps the birthday scene has been added by the director to admonish Shivani's kind of lifestyle in which she works even on the day of her birthday just as any man would have done, instead of celebrating with her family. That very evening, not only has she successfully conducted a raid and nabbed a seasoned criminal, but she even goes back to the police station to complete the paperwork so that the criminal cannot escape scot free because of any carelessness on the part of the crime branch. While such workaholism is considered normal and actually considered commendable for men (numerous scenes depicting the heroes working very hard in the office in Bollywood films come to mind) the director seems to suggest that such behaviour does not suit women. It is her colleagues who have to tell her to go home, while they volunteer to take over. By stripping her of any feminine traits, the director ends up making her look rather mechanical and asexualized. While her colleagues snigger at the criminal (they have come to nab in the chawl) having sex with his girlfriend, she appears almost devoid of emotion and detached, for her all this seems extraneous to her duty and she even tells the criminal, *Rahman, tujhe toh mujhe shukriya bolna chahiye. Kam se kam akhri bar apne item ke saath game pura toh kar paya. Jafar toh beech mein ghusa ja rahatha*. (Rahman, you should be thanking me you know. It was because of me that you were able to enjoy with your girl.) She also expresses her displeasure by disconnecting the call when her superior scolds her for conducting the raid in a crowded chawl and for conducting the raid in her own way, with a rat.

"Past research on discrimination against women for high status jobs (e.g. management) has focused on descriptive stereotypes that characterize women as lacking the stereotypically masculine personality traits associated with these jobs" (Cejka and Eagly,1999; Heilman, Block, Martell, & Simon 1989). In this case, however, she is discriminated against imperceptibly by the director for these very traits. In a job that is typically male oriented and male dominated such as the police service in India, Shivani has to adapt to and display traits that

are typically masculine in order to succeed in her profession, so that the men she works with and her superiors do not discriminate against her (in terms of assigning her cases or even promotions) or the criminals she punishes also do not evade her just because of her gender.

In fact, she goes one step further than her men when it comes to working, when she jumps out of the car window to pursue a fleeing shooter, runs after the two on bike, manages to dislodge both of them from the moving bike and beat them, while her colleague/junior bumbles as he tries to nab one of the criminals who pours chilli powder on his face and runs away. We think that the act of putting on a masculine charade takes a higher toll on the psyche of the woman without the director already adding to the burden. As Rudman and Glick state at the very beginning of their article, "Women in performance settings face a catch-22. If they enact agentic behaviour to be perceived as qualified for leadership roles…suffer a backlash effect in the form of social repercussions."

And so Shivani in this film finds herself childless, aunt to a niece who has lost both her parents possibly in an accident, fond of an orphan and in a clearly dominating role with her husband and besides, it is also not very clear as to what kind of a marital relationship they have. The husband is hardly given any dialogues and is even made to go underground as she goes on a hunt to expose the kingpin of the sex racket to which Pyaari becomes an easy victim because of her unwanted status as an orphan.

While in the beginning, Shivani feels sorry for the young girl and tries to bring her home from the orphanage, so that they can celebrate her birthday, it is then that she unwittingly discovers that the young girl has been missing for a while and goes onto investigate the matter. Her police instincts are roused enough by now and she starts a preliminary investigation in which she discovers the sex racket operating in Mumbai. The young girl has thus become an unwitting victim to the greed of men and also women (Wakil's mistress Minu Rastogi also helps him and her son Karan runs the business successfully). For Shivani who follows the leads in the case to Delhi, it later becomes more of a challenge, just as it would have been to any man.

For Shivani then, the director seems to suggest that it is not so much about rescuing Pyaari as it is about taking up the challenge and destroying the villain – a man. In the end, it all boils down to that. This is how any male hero would have behaved too – exacting revenge etc. If one looks at the genre of revenge sagas in Hindi cinema one can see that seeking revenge and successfully avenging wrongs done to the hero's family has always been the prerogative of males and portrayed to the hilt in Hindi cinema throughout the 1970s, especially the

Amitabh Bachchan starrers *Zanjeer*, *Dewaar*, *Sholay, etc.* to name a few of these films.

Except for the film, *Khoon Bhari Maang* (1988) in which Rekha avenges her so called murder at the hands of her cheating husband, and the ill treatment of her children at the hands of their step mom, one hardly sees women in such roles in films. The only other instance that comes to mind in recent times is that of Vishal Bharadwaj's *Saat Khoon Maaf* (2011) in which we have an agentic woman, Susanna, played by Priyanka Chopra, simply killing off six of her husbands because they fail to live up to her demands of being loving, understanding, kind and companionable. But such films in India depicting women displaying agentic behaviour are few and far between.

Shivani, as we have argued earlier is always attired in men's clothes to further the agenda of the director. In fact, what is meant to give one freedom, in terms of movement, as she is also a police officer of the crime branch (she is normally seen outdoors and in action) is actually used by the director to stereotype her. In the narrative, she is also seen to exercise at home with dumbbells, doing push-ups as well as chinning, usually the prerogative of men and used in films to depict heroes like Salman Khan and Sanjay Dutt onscreen. Women are hardly portrayed exercising on screen and even if they are shown exercising they are portrayed in ways that highlight their sexuality and desirability.

In fact, in *Dabangg,* Salman Khan in the role of a 'dabangg' police officer (used as a kind of counterpoint by the director perhaps) has to act hyper masculine. In order to be so hyper masculine, he single handedly takes on all the goons first in a warehouse, then in an eatery, next at the railway station, all while his inferiors only look on. From a psychological point of view, the collective unconscious of Indian females may reject the entire notion of liberation from patriarchal dominance by donning male attire. The message of freedom from the clutches of patriarchal dominance may fall flat on its face if the women are asked to ape the so called 'male' mannerisms appreciated by society in general. The question then arises do women have to adopt an artificial image for converting their identity into a powerful entity which is acceptable to the person on the street?

In the film, women are fore grounded but in rather different ways and in an almost antagonistic way,-one is considered to be 'mardaani', only if she performs the rescue and the other is conniving and greedy and rather a monstrous figure, e.g. a *dhandewali* who helps Wakil in the sex trade and in the end is savaged by the kidnapped girls and turns paralytic in a poetic justice of sorts. Meenu Rastogi is also portrayed as a bad mother and her failure is highlighted when the director

reveals the fact that although her son had attended the prestigious Hindu college, he is a drop-out who takes after his biological father in running the sex racket and who actually proves to be the villain of the piece.

It is also interesting to note the portrayal of the villain Karan, who is young (as is evinced by his looks) and who displays immature behaviour, which Shivani is quick to point out: she calls him the twelfth man of an under-19 team. What comes across, is that for a woman to tackle a protagonist he has to be boy-man and definitely immature. It is almost as if the director is trying to say that a wizened man as an antagonist would have proved to be a tougher call for Shivani. The director also kills off Wakil, a much more seasoned and capable criminal in the early half of the film.

Shivani, although agentic, is a Senior Inspector in the Crime Branch of the Mumbai police and perhaps an Encounter Specialist as well, and a woman, who is taken seriously and almost revered by her male colleagues, is able to successfully organize raids and flush out the scum of society, is agile enough to gather intelligence about the sex trade, and is able to rattle off the various sections of the Indian Penal Code (IPC), (not usually the prerogative of women in Hindi cinema, for the same reason one doesn't see many women lawyers being portrayed in Bollywood) she is still not seen as communal. For, nowhere in the film is it depicted that she has a successful family life as well; in fact, what comes across is that she gives more importance to her job and her family is of secondary importance to her.

Although the woman tries to reverse gender stereotyping by taking on a job which is generally the province of males, nonetheless she is not allowed to exert the power as backlash occurs many times, as is discussed in the paper. Within the narrative space, it is usually a toss-up between two kinds of women: one, who is termed as aggressive if she tries to be assertive and the other as 'evil' as she indulges in the sex trade. There is never a third category of woman that other women can identify with, in Hindi cinema.

There is an invisible glass ceiling that exists for every workingwoman in an organization. There is almost a tacit understanding between her male colleagues and seniors that she can only try reaching up to a certain point as far as promotions go. But, reach higher and she is hit by an invisible barrier that prevents her from making any progress in her career. A fear of the unknown haunts her; she feels threatened by society, family and begins to doubt herself. Her growth and empowerment is thus stalled by this invisible wall.

Cinema being one of the most powerful mediums and extremely capable of generating mental images should be very careful while portraying such sensitive

issues, as the depiction of women's issues. Such a vision only helps disseminate and circulate such images more and more; so much so, that it becomes a kind of vicious cycle that women find difficult to escape from, both literally and figuratively.

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Jaspreet Singh Sandhu*

China's Rapid Strides in Aviation Industry: Implications for Indian Air Force

Abstract

Until the 1990s, it was no secret that China possessed one of the most laggard and technologically backward defence industries in the world. But Deng Xiaoping's orchestrated plans of channelling private funds into defence R&D provided the required impetus for the growth of the aviation industry in China. After nearly three decades of investment, reorganisation, and acquisition of broad foreign technology, China's aviation sector is now well on its way to making China one of the top two or three global air and space powers by the 2020s.

In view of the changing geo-strategic scenario, increased asymmetry in terms of air power of China vis-a-vis India, it is an imperative to examine the implications of the burgeoning Chinese air power capability for Indian Air Force in the medium- as well as the long-term. This examination delves into a reality check on the Chinese aviation industry through an Indian prism and the likely air power capabilities which China likely to acquire through its proactive aviation industries. The Indian government is aware of this fact and new incentives have already been introduced to rejuvenate Indian aviation industry; however, the present incentives of 'Make in India' and strategic partnership need to be recapitulated further.

Introduction

China has emerged as a major regional power with clear aspirations to be a global power soon. Comprehensive military modernisation programmes supplemented with sustained economic, scientific and technological developments have substantially elevated China's international profile. Post-

* **The author** is an officer in the Indian Air Force.

independence, the Chinese had set up a defence infrastructure modelled on the lines of the Soviet Union but with Chinese characteristics. Therefore, the arms industries over the years have been able to produce a wide range of conventional weapon systems like tanks, small arms, armoured vehicles, artillery, missiles, bombers, fighters and naval vessels, which though obsolete when compared with the West, were nevertheless, manufactured indigenously.

Until the 1990s, it was no secret that China possessed one of the most laggard and technologically backward defence industries in the world. Most indigenously developed weapon systems were of inferior quality and trailing way behind the west by at least a decade and a half, if not more. However, with Deng's orchestrated plans of channelling private funds into defence R&D, provided the required impetus for the growth of the Aviation Industry in China. After nearly three decades of investment, reorganisation, and acquisition of broad foreign technology, China's aviation sector is now well on its way to making China one of the top two or three global air and space powers by the 2020s. China is now producing two fifth-generation fighters and the Chinese-made, carrier-based, e2 fighter is undergoing trials. These fighters are equipped with Chinese-made world class precision air-to-air and ground attack weapons. China employs more than 1,20,000 personnel in aviation related R&D, making it the largest in the world.

Hence, Chinese aviation industry, which was earlier impaired by the unwillingness of the conservative leaders to implement path-breaking reforms, has been reversed in this millennium and the industry is fast consolidating to be able to rub shoulders with the top ranks in the global aviation sector.[1] It has been observed that there has been a definite shift in the guiding principle driving the aviation industry, from earlier obsession for quantity to now quality, from being a technology imitator to eventually becoming an enabler, with a major thrust on the sector to transcend and match up to the global standards, if not by 2020 then at least by 2030.

However, China's emergence as a military superpower against the backdrop of its propensity for military conflict over contentious issues raises strategic uncertainties and concerns about China's future military directions. It's truism that the twenty-first century future, of not just Asia, but the entire world, will be significantly determined by the relationship between the globe's two fastest growing economies, China and India. As most observers know, there have for long been kinks in the political-military relationship between the two countries. India, despite being amongst the top ten defence spenders in the world, continues to procure over 70 percent of its equipment needs from abroad. As a result,

India is unable to extract the maximum benefit for its economy from the expansion cycle driven by the modernisation plan of its aviation industry. India must rapidly shift focus from acquiring platforms to developing capabilities, absorb R&D as an integral part of the system. The aviation industry in India needs to strategize by becoming a part of the global supply chain which can, not only invigorate the aviation industry, but also bring along with it better management and financial practices, improve efficiency and produce better quality products for the end user.

The Puzzle, Assumption, Rationale

The dwindling strength of fighters in the Indian Air Force (IAF) due to delayed and inadequate acquisitions, over-reliance on imports and the slow growth of indigenous Indian aviation industry, in contrast with rapid strides by the aviation industries of China, has resulted in a greater asymmetry in terms of air power capability between the two countries and imposes a greater threat to IAF in case of any future conflict.

Comparison of the force levels as they exist today and the extended sphere of influence that China and India will acquire through planned inductions and production capabilities of their aviation industries in the future, IAF will not be able to match Chinese air power capabilities by 2030.

With recent changes in the geo-political scenario in the Indian sub-continent, Sino-Indian relationship is facing new challenges in the form of 'Doklam' and rising border issues of transgression in Ladakh as well as in Arunachal sector. In view of this changing scenario, increased asymmetry in terms of airpower (of China with respect to India, which has been acquired by virtue of its thriving Chinese aviation industry in comparison to the slow and weak Indian aviation industry) needs to be updated to examine the threat it poses to IAF in the medium as well as the long terms. This examination entails a reality check on Chinese aviation industry through an Indian prism and the likely airpower capabilities which China is going to acquire through these aviation industries. The Indian government is already aware of this fact and new incentives have already been introduced to rejuvenate Indian Aviation Industry; the present incentives of 'Make in India' and strategic partnership need to be recapitulated to provoke qualitative as well as quantitative analysis of air power capabilities of both countries in a present day scenario and thus draw the future with respect to future plans.

The article attempts to enquire upon the modernisation of aviation industries of China in terms of recent developments with prime focus on the military aircraft in general and fighter aircraft in particular. On similar lines, Indian aviation

industry is analysed in terms of ongoing fighter air craft projects as well as peek into the future after implementation of new incentives by the current Indian government to predict likely airpower capabilities between the two countries by 2030.

China's Aviation Industry: Evolution and Revolution

China has recognised the strategic reality that in its move upwards to military superpower status, it should contend not only with the US but also with many competing regional powers for the same power status and the main complicating factors in this are its territorial disputes with them, which could hinder China's military rise. It has also realised that such regional powers could be induced to gravitate towards the United States if China continues to exploit border disputes as strategic pressure points. For the last two decades, China has deeply studied the military developments that are taking place across the world, with a primary focus on the United States. Seminal moments like the co-ordination of the US air campaign during operation "Desert Storm" were wake-up calls for Beijing to modernise its military. At the same time, the increasingly global lines of communication that sustain the Chinese economy concurrently began to extend beyond the People's Liberation Army (PLA)'s ability to project force. As China moved into the twenty-first century, its military was intent upon following and integrating the teachings of the western military powers. From developing the JF-17 fighter jet, which is equipped with the Russian engine, to bringing the new J-10 fighter on line equipped with a domestic engine, China has already refined its domestic military aviation industry. The ability to design and produce indigenously, two fighter aircrafts possibly equivalent to the early F-SC is noteworthy.[2]

Emergence as an economic superpower was not a challenging task for China but it faced substantial number of challenges in its pursuit towards achieving the same status in the field of aviation. In order to prove its hegemony in the sub-continent, supremacy in terms of 'Air Power' was the first priority for China. China's aviation industry was plagued by problems of inefficiency, redundant leadership, and overlapping organizational and bureaucratic structures. However, with China's strong economy and prioritized military development, such problems were eradicated in due course of time. With the inception of reforms and opening-up of PLA modernisation plans, problems in China's outdated aviation industry began to surface, prompting the leadership of People's Republic of China (PRC) to reinitiate a series of reforms. In May 2008, China established the Commercial Aircraft Corporation of China Ltd. (COMAC), and in November 2008, China merged China Aviation Industry Corporation I (AVIC I) and China

Aviation Industry Corporation II (AVIC II) to found the China Aviation Industry Corporation (AVIC). This overhaul of the aviation sector was an indication that the pace of development and reform in China's aviation industry is picking up. Therefore, China's determination and injection of resources into the industry should not be underestimated by the outside world.

In 1991, the Soviet Union collapsed and the environment changed to China's advantage. A desperately cash-deficient Russia offered to sell modern aircraft, weapons and high-tech equipment to China whose booming economy could provide ready dollars. Many jobless scientists, experts and technicians from the Commonwealth of Independent States (CIS) were also available for hire. Israel transferred designs and production technology to manufacture the Lavi jet fighter in the Chengdu Aircraft Industry Company and thus began development of the J-10[3]. The JF-17 was also being developed in collaboration with Pakistan as a result of these steps. Chinese aviation made good progress in all fields except aero-engines and fire control radars. These shortcomings are being addressed and China is reported to be investing in aero-engine R&D to cover this technology gap. China has transformed itself from a country that imports the assembly line of fourth generation fighters to a country that can now export the assembly line of fifth generation fighters.

China's Transformation: Imitator to Creator

China's efforts to acquire, produce, and develop fighter aircraft and related technology gained sufficient momentum by the early 1990s. China's quest to develop advanced fighter aircraft which required the most sophisticated level of aerospace technology and presented unique design and fabrication challenges for its military aviation industry was addressed through a series of organizational reforms. Significant advances made in the areas of material science, avionics and power engines from the defence arena have crossed over to the production of civilian aircraft. Over the years, China had been using 'Russians' as a quick fix solution during crisis and as a panacea for People's Liberation Army Air Force (PLAAF)'s depleting stock of sophisticated aircraft. In the early years of transition, there was technology flow from the west through the 'Peace Pearl' programme, as well as notable assistance from Israel and Italy. The Israel Aerospace Industry (IAI) was instrumental in providing significant exposure to China in the realm of high end technology through the 1980s and 1990s, which created concern in the American establishment. As a result, Israel was coerced into abandoning the sale of the Phalcon AWACS to China in 2000.

China's growing insecurity because of an overt dependence on the West for high end technology was reaffirmed by its belief, when it declared that there

was no substitute for self- reliance. Therefore, China had to quickly transmute from walking on four legs to standing on one's own two feet. Hence, it was left with no choice other than to develop a robust R&D infrastructure to counter its seasonal isolations from the West, which had been displaying a systematic 'on and off' strategy, with some regularity, particularly when it came to the business of providing assistance in high end technology to China. As a result, China decided to strengthen its R&D base by churning out large numbers of graduates and engineers in the mid-1990s and providing them incentives to travel overseas for higher education. The intention was to utilise the qualified human resource which could later be re-injected into the system to augment the capability of some of the strategic industries and help to build a strong R&D base for china. China's growing domestic capability has made rapid advances since the 1990s when China was mostly producing copies of obsolete Soviet era air craft.

Gaps in technological capabilities were filled by building alliances with foreign components and 'parts' manufacturers who are also suppliers or partners of Boeing and Airbus. Also, China has been able to entice foreign competitors to voluntarily transfer knowhow, using its huge domestic market as leverage. The practice of outsourcing has also worked to the advantage of Chinese aircraft makers. Indeed, the proliferation of foreign component and part suppliers allow Chinese aircraft makers to easily source what they are unable to produce. Presently, China's aviation industry is producing two indigenous fourth generation fighters, the J-10 and J-11. China's is the only country in the world who is pursuing two most prominent fifth generation stealth fighter projects, which are J-20 and J-31. Not much is available about the performance of J-20 and J-31, but how advanced they are, as compared to the western and Russian stealth fighters is yet to be seen in times to come.

Fifth Generation Fighters

The mantle of fifth, or even sixth, generation multirole combat aircraft (MRCA) development has unquestionably moved east, with no less than five Asian countries involved in indigenous future MRCA projects, and the leader of the field is China. With a $ 132 billion defence budget, an increase of 12.2 percent over the previous year, China is forging ahead with the development of a range of advanced MRCA for PLAAF. These include:

(a) J–20: Chengdu Aircraft Corporation (CAC) J-20, a fifth generation MRCA flew its maiden flight in 2011. This large twin-engine, twin-fin, canard/delta-wing aircraft, has internal weapons bays capable of housing air-to-air or air-to-ground weapons plus an additional single missile bay in each engine intake trunk; to date, six prototypes, powered by

Russian AL-31F afterburning turbofans have been flown while production of the J-20 may commence in 2017[4]. China was initially projected to have fifth generation aircraft by 2020. PLAAF Deputy Commander Gen He Weirong stated that this fighter will enter service between 2017 and 2019.[5] He also said that the planes in development will match or exceed the capability of similar jets in existence today. Just before Gen He's statement, Chinese internet sources stated a prototype of the fifth-generation fighter that started flying in 2010, albeit with a version of the 12/13 ton thrust WS 10A turbo fan in lieu of the 'not yet ready' 15 ton thrust engine.

It was also noted that China could acquire up to 300 of these fighters, which will have the "4 S" capabilities: stealth, super cruise, super manoeuvrability and short take-off. Both the Shenyang Aircraft Company 601 Aero Design Institute and the Chengdu Aircraft Company 611 Aero Design Institute were then allotted work in the "203" Programme. Both are thought to have been working on heavy twin engine stealthy and highly manoeuvrable designs to compete with the US and Russian fifth generation fighters. Chengdu has usually been associated with a twin-engine canard delta design. China is expected to have a handful of fifth generation fighters in service by 2020.[6] The general design concept of the J-XX is that of a fifth-generation fighter.

(b) J–31: As reported by the Chinese state media, China has tested the latest version of its fifth generation stealth fighter in an attempt to end the West's monopoly on the world's most advanced warplanes. These tests come as the nation flexes its military muscles, sending its sole aircraft carrier the Liaoning into the western Pacific to lead drills there for the first time. The newest version of the J-31- now renamed the FC-31 Gyrfalcon took to the air for the first time on 27 Dec 2016. The so-called "fifth generation" twin-engine fighter is China's answer to the US F-35, the world's most technically advanced fighter. The new FC-31 has "better stealth capabilities, improved electronic equipment and larger payload capacity" than the previous version which debuted in October 2012, according to aviation expert Wu Peixin. Changes were made to the airframe, wings and vertical tails which make it leaner, lighter and more manoeuvrable. The fighter is manufactured by Shenyang Aircraft Corp, a subsidiary of the AVIC. When completed the FC-31 will become the country's second fifth generation fighter after the J-20, which was put on its first public performance at the Zhuhai Air Show in November 2016.[7]

There is also a possibility that China could have a programme for other fifth generation fighters, perhaps to include a medium weight fighter to complement its reported heavyweight fighter programme. Nonetheless, as the capabilities of China's aviation industry begin to approach those of the rest of the world, the latecomer's advantage will no longer be obtained. In the absence of an indigenous combat aircraft programme, Israel is unlikely to be able to provide China with state-of-the-art aviation technologies outside of such key sub-systems as avionics. Thus, further improvements in the capabilities of China's aviation industry will increasingly depend on its indigenous capacity for technological innovation. From 1990 through 2010, specific to the PLAAF, the implications of a growing fleet of fourth generation fighter aircraft hold two potential meanings. For the strategic intentions of China, they represent a natural replacement for 40-year old fighters, thus, adding to the national prestige. To current military analysts, the increased lethality represents a force that can potentially skew the entire regional balance of power. The move from the Chinese Air Force of over 5,000 aircraft to one of 1,617, approximately 500 of which are modern, changes the range of strategic employment options available to the PRC.

China's Modern Air Force: Implications in IAF

Incidentally, there is an interesting relationship between the Hindustan Aeronautics Ltd (then Hindustan Aircraft Ltd.) and the Chinese Aviation Industry, historically. Douglas Pawley, a private American businessman, who had set up a number of aircraft factories in China in the 1930s was looking to wind them down due to the advancing Japanese forces invading the country. It was William D Pawley who, through a chance meeting with Walchand Hirachand, an Indian businessman, in an airliner, flying from the US, decided to transfer his operations to India and set up a joint venture by establishing the first aircraft factory in India in 1939, the Hindustan Aircraft Ltd. (now Hindustan Aeronautics Ltd.).[8] Comparative analysis based on modern sophisticated Chinese Air Force vis-a-vis the present-day combat capabilities of IAF need to be revisited to access the threat scenario in the Asian subcontinent. Based on the fact that Airpower strategy and the aviation industry have advanced together, insight into what Airpower strategy, both countries might foresee in future becomes even more relevant. Thereafter, it peeks into the current status of IAF with focus onto its Indigenous fighter project "Tejas" as well as the future of India's fifth generation fighter projects.

With an analysis of planned inductions as well futuristic production capability of its aviation industry, comprehensive military power can be calculated with respect to both the countries. By virtue of SWOT analysis (strength, weakness,

opportunity, threat), application of Chinese air power against India was analysed wherein it was assessed that current Chinese air power can be used from air force bases located in Tibet but still would not pose an unmanageable threat to the IAF. Indeed, given the inadequacy of secure and hard shelters for its fighters in Tibet, The PLAAF would presently face serious problems of surviving a battle against India. However, the advent of the new generation fighters like Su-30 MKK, J-10, J-11, J-20, air refuelling capabilities, airborne radar and an improved air defence system will further improve China's capabilities in the coming years and will prove to be a threat worth reckoning with.

Analysis with respect to the aspects of quality and quantity of the production capabilities of the Aviation industries of both, China and India, and India's role in the changing geopolitics in the region under preview of current rise of China, is viewed both in terms of threat as well as an opportunity. While India must accept the inevitable rise of China as a challenge but, at the same time also prepare to leverage greater influence on other nations in the region to maintain the balance of power, which would help India address its security dilemma. Hence, while both China and India in their own interest must build capabilities, they must also accept the fact that the future order in Asia will have the capacity to absorb the aspirations of both the countries concurrently. However, Indian policy makers must chip-in and provide greater impetus to defence, building military capabilities not only through imports but also by the process of indigenization and thus reverse the extremely skewed self-reliance index. If India wants to elevate its status and leverage greater influence in the evolving new order in Asia, it would not only require increasing its military capability but also expanding its self-reliance as well as intellectual capacity that is required to combat the threat of an emerging regional power.

Changes in the PLAAF doctrine and concepts have had an effect on the development of an advanced industrial and technological base. China has for long been trying to develop its indigenous defence industry because of the realisation that foreign countries will not part with critical technology. To develop its own industry, China has spent many resources on R&D and on procuring Western technology illegally, by cyber-attack, espionage and finding loopholes in western sanctions for dual use technology. As a result of these steps, the Chinese aviation made good progress in all fields except aero-engines and fire control radars. These shortcomings are being addressed, and China is reported to be investing in aero-engine R&D to cover this technological gap.

Conclusion

From the Indian stand-point, the ineptitude on the part of the government to

capitalise on the knowledge generated by rising industrialization is glaring evidence. Hence, despite being amongst the top ten defence spenders in the world, India continues to procure over 70 percent of its equipment needs from abroad. As a result, India is unable to extract the maximum benefit for its economic growth. Nevertheless, if India at all wants to reverse this imbalance and in future compete with China, it would have to bring about innovative and creative reforms. India will rapidly have to shift focus from acquiring platforms to developing capabilities, absorb R&D as an integral part of the system by focussing on components in the denial list and look at R&D from a long-term perspective as an investment for future growth. The industry will need to strategize by becoming a part of the global supply chain which will not only invigorate the aviation industry as a whole but also bring along with it better management and financial practices, improve efficiency and produce better quality products for the end user.

India's reaction to reforms in China's aviation industry and its progress in military modernisation is a natural response by any growing superpower. China is merely exercising its legitimate right to modernise and guarantee its national security by preparing for asymmetric operations firstly against the 'state-of-the-art' military powers which would automatically prepare China against any other rising power in the evolving world order, and India too could strategize for the future. From the Indian perspective, the rise of China's military must also be viewed as a driver to spur India's future military capability and capacities.

China's rise by default has drawn out a roadmap for India's military strategy and modernisation and, hence it is now upto India, to maximise from the opportunity and narrow the gap in military capabilities between the two countries. Therefore, China's rise has to be clearly and closely monitored by India. India, like China is at an advantage, with its economy expected to grow at 7-8 percent based on strong fundamentals, robust institutions, vibrant democratic system, and is largely perceived as an attractive market by investors across the globe. India needs to be cautious about China's continuous increase in military budget, which would widen the gap in its capability and, as a result, create greater asymmetry between China and India. Therefore, India needs to strategize in the coming decade, look at its military expenditure as a long-term investment which will not only invigorate growth in the aviation sector but also, place India in a position of advantage with the changing geopolitics in the region.

Recommendations

After exhaustive exposure to the various aspects related to Chinese aviation

industry as well as Indian aviation industry, the following recommendations to boost the Indian aviation industry can be considered.

(a) Transparency of the work culture of the various government-run R&D institutes needs to improve. People need to be made accountable for long delays in rolling out key projects. The 'blame game' so inherent to the government institutes needs to stop immediately and the focus should shift towards creating a healthy atmosphere in the industry. Policies of either perform or perish have to be followed to compete in the open market at a global level.

(b) Departmental procedures and willingness to share information between the Government organisations like DRDO labs as well as private partners like L&T, Bharat Forge, etc. need to improve. In case, DRDO continues to hold essential data required for R&D by private partners, under the clause of confidentiality, private groups will ultimately choke and vanish from the Indian Aviation Industry in no time. If required, a nominal consultancy fee can be charged to the private firm by the DRDO labs but exchange of essential information for development and progress of this sector should and must be shared.

(c) Hegemony of PSUs like HAL, BEL needs to be stopped immediately. On close interaction with different private firms who have finished developing their products, it is often found that they are still waiting for certification and field trials. Procedural delay in certification leads to huge financial losses, which means a lot to the private firms, where they are accountable to their shareholders and investors. Departmental hurdles by our 'White Elephants' need to be removed for this industry to survive and have fair a chance in this competition. Such is the level of juxtapose, that for each and every certification, all private defence firms have to approach DRDO, who are the nodal agency under MOD. The rising level of discomfort which has risen in various DRDO labs as well as PSUs like HAL & BEL, since the entry of private firms into defence manufacturing is no secret to anybody. Under such conditions, putting these private partners under indirect approval and a farcical certification game is akin to pleading non-guilty in front of hungry Lions. In case the interference of PSUs and DRDO in the acquisition process is not removed, all the private players will end up losing all their money to lengthy and tedious evaluation and the certification game and finally Hegemony of DRDO and PSUs will prevail as it was before and no progress will be seen in this sector.

(d) Rules and regulations regarding export of Indigenous defence products needs to be eased. This will provide a wider customer base to our private industry, wherein they do not have to totally rely on the Indian Armed Forces for their orders. At the same time, with better revenues from their sale abroad, they will be able to consolidate their position in the global market and hence will project a strong global appeal for Indian aviation products.

(e) Interaction between R&D, the manufacturer and finally the end user is the major grey area, right now. It was a glaring fact that R&D done by research labs has very little sight into the tactical applications of the project they are working on. User Interface was missing during the entire process of R&D and even manufacture. This interface has been the primary stimuli of the growing mistrust between users and the manufacturing agencies, wherein the user will always have a greater inclination towards products from a foreign manufacturer than indigenously manufactured products due to this glaring discrepancy in indigenous products. Close interaction between the user and the manufacturer, during the different stages of development will reduce the flaws and shortcoming which are likely to come out during field trials and also infuse confidence in the users.

(f) Quality assurance of our indigenous aviation products is an issue, which keeps troubling our aviation industry perpetually all the time. The refusal of the French to validate the guarantee on the Indian manufactured 'Rafale' fighter was considered as a major thaw in the entire deal. We cannot blame the French for this, because we know our fault lines, which we have not been able to correct in the last almost five decades. Finally, accountability needs to improve and people should be held responsible for poor workmanship and quality control, irrespective of the seniority of their positions or their political connections. We can no longer lose lives of potential users to faulty products by our PSUs. These faulty products, apart from costing precious lives, and thus our prestige also, give a poor name to the Aviation Industry of our country.

(g) The advent of the new Defence Procurement Policy (DPP) and Defence Procurement Manual (DPM) 2016, the formal introduction of 'Make in India' and giving a top priority to indigenously "Designed, Developed & Manufactured" products is a welcome step by the new government. Defence R&D is a costly affair for any private player. Private firms are responsible to their shareholders and require influx of regular capital to

sustain themselves in a highly competitive market. Hence, private firms are looking for firm orders from the Indian Designed Developed & Manufactured (IDDM) may sound good on paper, but it is a regular and assured supply order, which is vital for sustenance. Otherwise, private defence firms will close down with the same speed in which they actually opened.

(h) HAL has to grow itself beyond LCA. Upgradation of LCA has to gain momentum to keep pace with the evolving aviation technology and Air Force needs. Observations made by its primary users, i.e. IAF need to be addressed on a priority basis.

(i) Realistic execution towards Indigenous Fighter projects like the AMCA (Advanced Medium Combat Aircraft) need to be expedited; otherwise, the project will suffer indefinite delays and eventually turn into a tug of war between the manufacturer and the User, similar in lines to its predecessor LCA.

(j) Though recommendations of Committee on Requirement vs. Feasibility of Fifth Generation Fighter Aircraft (FGFA) for IAF are yet to be opened in public domain, still on hindsight, if India still wants to pursue its FGFA without Russian Assistance, experienced and proficient man-power needs to be enrolled on a priority basis, who have the capability and can roll out projects of that significance. Leaving it purely on HAL and DRDO will take the project back by at least another 20 years which is definitely not in favour of INDIA.

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Sachin Kumar*

Effects of Offensive Application of Air Power on Low-Intensity Conflicts

Abstract

Combat air power is best suited for limited conflict. Primacy must be given to 'air power' and 'naval power' especially in a limited war over projection of 'land power' resources. In fact, during most of the low-intensity conflicts, aerial reconnaissance missions are launched much before the first contact battle. Air power with its unique traits and modern day weapons can target the intended jugular vein of the enemy with pinpoint accuracy without any large-scale collateral damage. With careful selection of targets, weapons and platform, low-intensity conflict operations can be terminated early by using offensive air power.

In the Indian context, since the inception of the IAF, air power has been utilised in all low-intensity as well as full scale wars barring the exception of the 1962 Sino-India conflict. From counter insurgency operations in Waziristan to the Kargil operation, air power has proved its efficacy beyond any doubts. Meanwhile, one can notice that there was no escalation of the scale of battle, solely because of the use of air power. Though there is a school of thought in India, which believes that the use of offensive elements of air power escalates the scale of battle, there is very less factual, historical or statistical information behind it. Air power, being the most suited force for rapid action, has to be a part of the response in limited conflicts. The Indian doctrine on low-intensity conflict can be drawn around the primacy of offensive air power.

Introduction

'War' and 'Peace' are the two most widely used, as well as the most misunderstood terms in the parlance of statecraft. Peace does not mean an abject

* **The author** is an officer in the Indian Air Force.

lack of conflict and war does not imply a full-fledged struggle. There are a range of activities in which countries engage, which do not always generate a declaration of a 'state of war', but which would hardly qualify for the designation of 'state of peace'. Such activities may be defined under the broad heads of limited war and low-intensity conflict. Whenever a state engages in low-intensity conflict with another state or non-state actors, it utilises all elements of National Power to force its will on the enemy. Air power, though a late entrant in warfare domain, has matured over the years to provide resolute options in any conflict.

The influential role of Air Power in conventional wars has been accepted since World War II. Most military doctrines profess that without the control of air, surface battles will not/cannot culminate in desired time frames. Air Power possesses unique characteristics like speed, reach, flexibility, responsiveness and shock effect, which can make a significant contribution in low-intensity conflicts. Air Power, being a military tool of statecraft, is best suited for offensive action, though there is an ostensible escalation attached to its use. While being on the offensive in a combat, it is imperative to avoid collateral damage, more so, in low-intensity conflicts. Towards this end result, certain basic requirements for using the offensive elements of Air Power in limited conflicts are: accurate intelligence, low calibre weapons and Precision Guided Munitions. They serve as primary catalysts to avoid escalation along with certain other measures.[1]

Since its inception, the Indian Air Force is performing assigned tasks meticulously including operations in limited conflicts. The Air Force, like other instruments of our national power, has been used in low-intensity conflicts. Historically, there has been no record of escalation of any low-intensity battle, primarily because of these air actions, yet there exists a lot of apprehension in application of offensive air power. This hesitation in employment of air power is clearly visible in the conduct of our military operations and in many or almost all of our strategic doctrines.

Basic doctrine of the Indian Air Force (IAF) spells out its vision and mission statement as "to acquire strategic reach and capabilities across the spectrum of conflict" and "to be a modern, flexible and professional aerospace power with full spectrum capability."[2] The IAF also recognises that it is more than likely that it will be the first to enter the fray. The ability to more readily ratchet up or down the intensity of conflict make IAF the prime service to effect deterrence and coercion.[3]

Kargil was perhaps the last limited conflict that India fought in recent times. In this instance, the IAF had a delayed entry into the battle because of various reasons, the primary one being the concern of escalation. Severe restrictions

were imposed on the use of offensive elements, yet the result was out of proportions for air strikes. Though it was employed late, Air Power had a profound and a very decisive effect on the battle. Not just in the Indian Sub-continent, Air Power has been a success in limited conflicts across the globe. It is imperative to study the effect of offensive application of Air Power in various low-intensity conflicts and determine the intimidation factor of escalation.

Low-Intensity Conflict (LIC) and Application of Air Power

Low-Intensity Conflicts

Low-intensity Conflict is generally defined as an armed conflict that is above the level of peaceful co-existence and below the threshold of war. It is a 'miniature' politico-military struggle to achieve political, socio-economic or psychological objectives. Various kinds of low-intensity conflicts include proxy war, acts of terrorism and insurgencies. Border skirmishes also fall within this category. Few theorists include sub-conventional threats in the list. A low-intensity conflict is generally confined by geographic limits and traditionally characterised by constraints of weaponry, tactics and a certain level of acceptable violence. A state can be involved in low-intensity conflict against a state or against non-state actors or even with its own citizens.[4]

A pictorial representation of various conflicts is depicted in the figure bellow.

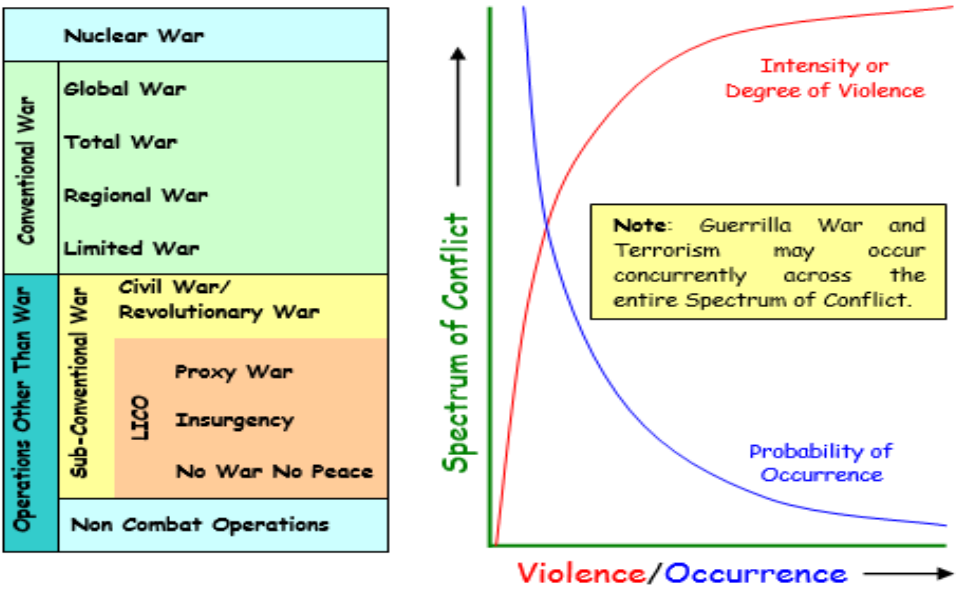

Fig. 1: Scale of Conflicts[5]

Redefining Low-Intensity Conflicts

For the purpose of this study a fairly broad definition of low-intensity conflict is considered, *Low-Intensity Conflict is a military confrontation between states or state and non-state actors below the threshold of conventional war and above that of routine peaceful competition.*

Defining Offensive Air Action

There is a general understanding that a planned drop of air-to-ground armament from a fighter aircraft is the only or the most suitable option that is exercised as offensive application of Air Power. There are numerous other offensive applications of Air Power in low-intensity conflict operations. Few illustrations to amplify the ambit of offensive application are the following:

(a) A wide body transport aircraft using its tail mounted gun to fire on ground during an assault landing.

(b) An armed or attack helicopter firing to defend the escorted package, like on a special heli-borne mission on escort duty to a causality evacuation.

(c) An armed drone on a search and strike mission using stand-off precision munitions.

Academicians deliberate that it is the intent, which defines aggressiveness and not the physical damage. Some scholars further drag the definition of offensive application to an ethical level, wherein they say that insertion of combat ready troops by means of an aircraft into an objective area is also an offensive application of Air Power. For the purpose of research, offensive or kinetic use of Air Power is defined as "any air operation that directly or indirectly leads to force application on to the adversary".

Relevance of Low-Intensity Conflicts

India is geographically located in a hostile neighbourhood. There are several internal disturbances, these in turn, fuelled by its neighbours and various other non-state actors who are actively involved in undermining the sovereignty and tranquillity of the country. In fact, its immediate western neighbour openly talks of a low-intensity protracted war with India. In April 1990, the then Pakistani Prime Minister, Benaziar Bhutto, speaking in Larkhana in the Sind province, declared that Pakistan was embarking on a 1,000-year war to wrest Kashmir from India.[6]

Today three of the five nuclear states of Asia – China, India and Pakistan, are in the South Asian region. India shares land borders and maritime interests

with the other two. The presence of nuclear weapons in this region has not ruled out conflicts. Routine ceasefire violations[7] and various border standoffs[8] are testimony to the fact. Immediately after India and Pakistan carried out nuclear tests, Kargil happened in 1999. Both countries confronted each other again in 2001-02, but none of the events spiralled into a full-fledged war. These bear testimony to the fact that the possession of nuclear weapons does not make wars obsolete, it only limits war to some extent between two nuclear adversaries.[9]

Low-Intensity Conflicts and Air Power

All the conventional wars fought by India have begun with amassing of force and escalation if any was gradual in nature. There were intensified tensions, diplomatic posturing, and mobilisation of troops, border skirmishes and even airspace violations before the conflict. This process is however absent in low-intensity conflicts. Surface forces consume considerable time to mobilise and assemble. The IAF, nevertheless, is generally available for immediate action. In fact, during most of the low-intensity conflicts, aerial reconnaissance missions are launched much before the first contact battle. Offensive action is not permitted at the beginning of any conflict due to 'perceived escalation' and the effect of enemy air retaliation on our mobilisation. As seen in various campaigns (of low-intensity conflicts), against any state or non-state actors, air power is best suited to punish the enemy. It circumvents the fielded forces and attacks at a place that hurts the enemy the most when it is the most vulnerable.[10]

Combat air power is best suited for limited conflict[11]. Primacy must be given to 'air power' and 'naval power' in a limited war over projection of 'land power' resources.[12] Many of the strategists believe that deterrence can be achieved through denial or through punishment (or combining both). All three services are capable of providing deterrence through denial. However, in the punishment dimension that the individual services have different capabilities and roles, Air Power is most suited for deterrence by punishment and hence is better equipped to face challenges posed by low-intensity conflict operations situation.

The world over, air forces have been utilised in offensive operations in low-intensity conflicts. The list is big; few of the well-known examples are Malaysia (1948-60), Algeria (1954-62), attacks on Hezbollah by Israel (various timelines), Russian action on Chechnya (1994-96), North Atlantic Treaty Organisation (NATO) air attacks for Kosovo (1998) and Pakistan Air Force action on insurgent groups with in Pakistan (various timelines). Air Power has also been used in counter insurgency operations, which prevented the insurgency from developing into a limited war. There is no doubt that ground forces alone would have been able to defeat the insurgency. However, if integrated with the use of Air Power,

the insurgency will be defeated in a shorter period, with comparatively lesser loss of life and with a saving of resources.[13] Since independence, the Indian Air Force has used Air Power offensively in action against Hyderabad (September 1948), Liberation of Goa (December 1961), Operation for Diu (December 1961), Naga insurgency operations (1960-61), Mizo rebellion operations (March 1966), Indian Peace Keeping Force (IPKF) operations in Sri Lanka (1987-90) and during Kargil conflict (May-July 1999).

Capability and Employability of Air Power in LIC

Flexibility and versatility, mobility, responsiveness, shock effect, concentration, offensive action and reach are listed as the main characteristics of air power in the 'Basic Doctrine' of the IAF.[14] In a conflict scenario, military instruments achieve limited success if they do not utilise their complete offensive potential. The same holds good for air power. Hence, even with all its characteristics, Air Power may not be able to provide desired results if there is no offensive application. Offensive action of air power in a 'low-intensity conflict operation' situation is often assumed to be 'fighter strikes'. However, it means all air operations with an offensive intent. Mission could be carried out by fighters, helicopters and transport aircraft.

Today, air operations are reliable, accurate, focused and flexible. It (air power) is most conducive to retaining escalation dominance and can set the stage for a Limited War, designed to steeply raise costs for the Aggressor and seriously degrade his operational and Strategic reserves preferably in his own territory.[15] Traditionally during low-intensity conflict operations in India, air power has mostly been used only in support of ground operations. Air Power has to be used not only in sustenance operations but also and more importantly in offensive operations. Military scientists give arguments against strategic restraint war. Clausewitz, offers wise advice on the impending consequences of strategic restraint: "Kind-hearted people might of course think there was some ingenious way to disarm or defeat an enemy without too much bloodshed, and might imagine this the true goal of the art of war. Pleasant as it sounds, it is a fallacy that must be exposed: war is such a dangerous business that the mistakes which come from kindness are the very worst…it would be futile – even wrong – to try and shut one's eyes to what war really is from sheer distress at its brutality."[16]

Offensive elements of air power can be used in low-intensity conflict operations to target not only enemy's positions but also their supply lines and strategic reserves by a parallel application of force. There is an intrinsic mobilisation delay in amassing land forces and they can be interdicted by enemy

forces during this period. This will lead to either delayed application or reduced thrust in the battlefield. Hence, one can argue that Air Power is more suited as the 'first responder' to degrade the enemy potential. Use of precision weapons (along with hard intelligence) can provide 'out of proportions' result in limited conflicts. Rather than just the direct attacks, offensive elements can be utilised in 'Effect Based Operations' wherein the results are both direct and indirect. However, it should also be understood that use of Air Power with (prohibitive) restraints provides lesser then desired results. There are historic examples of this aspect from Vietnam to Kargil.

Air power can be successfully employed at any level of conflict including low-intensity conflict operations but the understanding of its effective employment has to be there among both the surface forces and air forces. When Major James Loden of 3 para, based in the southern Afghan province of Helmand, spluttered in a September 2006 email that the Royal Air Force was "utterly, utterly useless" at providing British Army soldiers with adequate close air support, he created a national furore…this flash-in-the-pan controversy actually reveals the persistence of the longest-lasting misunderstanding between air forces and armies…soldiers ideally want aircraft above them in cab-rank virtually every minute of the day, loitering until they call them down to accurately strike the enemy with whom they are in contact but without any fratricide.[17] This is not one 'out of the blue'/ unexpected incident; it could be assumed as merely the tip of the iceberg. Till such a time that there is complete understanding of characteristics and limitations of Air Power, its employability (and reputation, perhaps) will keep suffering.

In a land battle, a ground can be captured and held either by fire or by boots on ground.[18] This is applicable both in defensive as well as offensive operations. While carrying out future operations, Indian Armed Forces should accept the 'holding by fire power' concept. Holding by fire power, though not permanent, is more efficient in terms of asset utilisation and casualty control, for own forces as compared to 'holding by man power'. The perception of holding ground by fire power here does not mean that an aircraft is an extension to artillery. The tenets of Air Power are applicable across the entire spectrum of limited conflict. To gain control of air, counter-air missions need to be carried out. To deny mobility and counter-mobility, counter surface operations will have to take place. Air interdiction will be carried to degrade or isolate enemy strategic reserves or its logistics infrastructure. All of these operations other than Battlefield Air Strike (close air support) missions in all probable cases will not be visible, yet will have a profound impact. For our country, wherein we do not have any

territorial ambitions, a ground being held by fire for the duration of limited conflict can also provide similar albeit faster results.

Utilisation of Offensive Air Power in LIC Operations

The Indian Air Force has successfully applied offensive air power in various conflicts from NWFP in 1920s to Kargil in 1998. During 'Kargil operations', air operations, though restrictive, were not considered escalatory by the Pakistan Air Force (PAF). Air Commander Kaiser Tufail (retd.) of the PAF writes in his blog, "By 16th of June, the Indian Air Force was able to open up the laser-guided bombing campaign with the help of Jaguars and Mirage-2000.[19] Daily photo-reconnaissance long the Line of Control (LOC) by Jaguars escorted by Mirage-2000s, which had continued from the beginning of operations, proved crucial to both the aerial bombing campaign as well as to the Indian artillery….While the photo-reconnaissance missions typically did not involve deliberate border violations, there were a total of 37 'technical violations'. Typically, these averaged to a depth of five nautical miles, except on one occasion when the IAF fighters apparently cocked-a-snoot at the PAF (Pakistan Air Force) and came in 13 miles deep…. To sum it up, the PAF found it expedient not to worry too much about minor border violations and instead, conserved resources for the larger conflagration that was looming."[20]

The world over, air forces have been utilised in varied offensive operations in low-intensity conflicts. The list is large and operations are spread across the globe. In some of the campaigns, there is a mention of certain precautions that were undertaken to avoid escalation into a full-fledged battle, while in some the campaign commanders talk of overwhelming force to subdue escalatory enemy retaliation. In any case, there is no reported escalation that took place because the offensive air action was allowed. In the recent history of warfare, there are two conflicts which are worthy case studies, since they were primarily air campaigns in a limited environment with negligible ground force action. They are the US led NATO's Kosovo campaign[21] and the Israel Air Force action against Hezbollah in 2006:[22]

(a) The US Air Force claims Kosovo as a successful air campaign.[23] Though the war was won, the real story was actually quite different and unduly exaggerated. Milosevic agreed to the demands of North Atlantic Treaty Organisation (NATO) led allied force, but, the actual destruction to his forces was very low and not as it was falsely portrayed by him. There were false claims of target neutralisation and the figures were highly inflated.[24] The public announcement made by the US President that there shall be no involvement of ground and the lack of intelligence

proved to be disaster. The air campaign protracted primarily because of these two reasons. Later, when Milosevic was threatened of an overwhelming ground offensive, he succumbed to the NATO pressure. So, the Kosovo campaign reminds us that in India's case, it is very clear that Air Power alone, cannot win a war.[25]

(b) A good precedent for an air campaign in low-intensity conflict operations can be drawn from the Israeli Air Force's action in Lebanon to neutralise Hezbollah. In 2006, Israel fought an intense, month-long war with Hezbollah, the rst sustained air campaign conducted by a country other than the USA. In the campaign, the stage was set for air-land battle with both physical and psychological effects in place. Israel achieved most of the objectives assigned to its Air Force; however, since no overt ground action was carried out, Hezbollah survived. Hence, it can be clearly ascertained that modern day Air Power is capable of achieving all allocated tasks; however, achievement of a successful conflict termination is faster and much better in joint operations rather than solo air campaigns.

"Every modern war has a complicated and controversial narrative….The 1999 war over Kosovo was the ûrst war 'won' by airpower alone. But some argue, this can be considered a reality only if one ignores the fact that the threat of a ground war convinced Slobodan Milosevic to give in to NATO's (North Atlantic Treaty Organisation) demands….The 2006 Israel-Hezbollah conict, on the other hand hardly disappoints us in its competing narratives. Hezbollah labels its endurance and survival in face of the Israeli attack…. The Israeli government of Prime Minister Ehud Olmert equally asserts that the 2006 war was one of the country's greatest military and political victories ever."[26]

Other than the physical effects of air power, the psychological effects also determine the success of offensive application in low-intensity conflict operations. More than battle stress and anxiety it is the fear of an air attack which demoralises ground forces. In Afghanistan, Air Power has been used extensively in targeting the Taliban….As one Afghan fighter told the *New York Times* "we pray to Allah that we have American soldiers to kill, as these bombs from sky we cannot fight."[27]

Air Power and Associated Matrix

Escalation

Escalation can be defined as an increase in the intensity or increase in the scope of conflict that crosses threshold(s) considered significant by one or more

of the participants.[28] The escalation of battle in low-intensity conflicts can also be considered as a prohibitive factor. Any escalation will intensify the rate of attrition and one or all involved belligerents may not want that. Nevertheless, one has to keep in mind that fighting a battle with a premise that use of one particular way of force application is escalatory will definitely undermine the use of that force. In most cases, the retaliatory escalation will be limited to the equivalence of force or equipment level. For example, in case fighter sorties are utilised for any interdiction mission in low-intensity conflict operations, the escalation expected from other side is fighter sorties (either for air defence or counter strike). An air force is an offensive arm and offensive action is its metier. Yet, it has the important role of inhibiting, if not prohibiting, offensive action by the other side; a mission, hence given the title of air defence.[29] Any enemy action in terms of retaliatory strike has to face a stiff air defence. This should not be considered as escalation.

In limited conflicts, escalation is poor if only land forces are employed.[30] Ground forces have to physically assemble together or deploy the weapon platforms at a designated location before launching any offensive. On the other hand, Air power can bring in concentrated fire power onto the target area, easily while operating from dispersed locations and without any mobilisation. This actually makes it difficult for the enemy forces to respond in situ. So, with air power, in a low-intensity conflict operations situation, the enemy can be prosecuted, their offensive capability degraded and their will to fight subdued without having to resort to physical mobilisation of large number of troops, which would be time-consuming, expensive and cumbersome.

Offensive air missions can be launched as a calculated response and called off the moment the politico-military aim is achieved. Even without carrying out any mission, akin to ground forces, aircraft concentration at forward locations builds up pressure on enemy. This concentration can be achieved faster as compared to ground forces. To ease off the pressure, in the same way, this concentration of air power can just as easily be dispersed back to in-depth locations. The American bombing of Libyan targets in Operation El Dorado Canyon in 1986, the US missile strikes against suspected Al Qaeda camps in Afghanistan in 1998 and the IAF air-drop from An-32 aircraft on to the Tamil population in Northern Jaffna in 1987 are some examples of such offensive missions.

Any escalation in a battle is likely to drag the battle further. Long drawn battles are suited to certain states and are an existential threat to many others. Moreover, in case any of the belligerents decide to increase the intensity of the

battle, he will find ways, means and an alibi to do so. That alibi may or may not be air action. One of the adversaries may escalate the battle to 'punish' the other party since it can absorb a higher degree of attrition. In any case, there is an inherent risk involved in escalation with or without the use of kinetic air power. That is why military strategists weigh all the possibilities before planning and executing any response.

Offensive Air Power is Escalatory?

Few military scholars argue that kinetic application of air power can turn tides in limited conflicts and can hasten the conflict termination. While there is a school of thought in India that believes that any introduction of offensive elements of Air Force in a low-intensity conflict is likely to escalate the situation. The IAF doctrine states that the use of offensive elements of air power may lead to escalation of battle in sub conventional scenarios.[31] Though there is no mention of such escalation when using the same offensive elements in low-intensity conflict operations, the tenor of the document proposes the same for low-intensity conflict operations. Various authors including Air Marshal A. Subramanian (retd.), Major General G.D. Bakshi (retd.), AVM A.K. Tiwari (retd.), Air Commodore Jasjit Singh (retd.), and Air Commodore Ramesh V Phadke (retd.) have written in their literature that there is a prejudice in the Indian power centres, that offensive use of air power is escalatory in nature.

Direct examples can be picked up from the Kargil conflict that clearly show the apprehension and lack of understanding in the use of offensive Air Power in low-intensity conflict operations in India. Former Chief of Army Staff, General V.P. Malik (retd.) stated in his book that it was more than that just 'jihadis' who had occupied the posts in Kargil. He was ready to pump in more troops, yet he wanted to use armed/attack helicopters only for reconnaissance purposes. He further adds that the then Air Chief and the Cabinet Committee on Security, however, did not permit use of kinetic air due to fear of escalation[32]. However, in the same book, General Malik later writes: "On 19 May, Anil Tipnis (Air Chief) had addressed a long letter to me, with a copy to Sushil Kumar (Naval Chief), stating that there was considerable misconception about the use of Air Power and its political and operational implications."[33]

A historical background can be traced to this hypothesis of escalation. After its birth, the Royal Indian Air Force was considered as a mere appendage to the Army for years to come. British policies ensured that Indian Armed Forces especially the Air Force remained a sheer tactical force. All strategic guidance was made available only from the British Government. This 'deficit thought process' was visible during the 1947-48 Kashmir Conflict, which is till date the

longest war (or longest protracted conflict, as for war the two countries need to make the declaration) India has fought. Later top leadership of the Indian Air Force was not part of planning of Hyderabad Ops, Goa Ops and 1965 war. Offensive action was not envisaged during 1962 war. It was only in 1971, where in true potential of the IAF was utilised to attain national objective.[34] Nonetheless, this school of thought that use of offensive airpower will escalate the battle is still fostering in politico-military establishments. The same had seeped into various doctrines and campaign planning processes.

There are no specific reasons in doctrine that relates to this understanding of escalation caused by use of air power. Looking at the various conflicts across the globe, it is not clear when and how the perception grew within our country that offensive use of air power is escalatory. Some military historians believe that it could be because of the reason that aerial warfare is a relatively a new phenomenon as compared to surface battles. However, many of them also say that record of the wars in Korea, Vietnam, Arab-Israel, Iraq, Afghanistan and Kosovo have indicated that Air Power in itself is not escalatory.

Some modern writers have the opinion that 'low attrition warfare' can provide desired results without escalating the scale of battle. During the 2003 Iraq war, the United States Air Force came in open to say that it has changed its strategy to what is known as 'effects-based operations' from erstwhile 'attrition based approach'. The aim of effect-based operations is to minimise the effort required to neutralise the target. It carefully matches vulnerability of targets to the capabilities of the weapons system. Thus, destruction of the smallest component ensures the total collapse of the whole target system. It obviously reduces collateral damage. Some savants combine effect based operations with parallel warfare to optimise the results.[35] Use of air power to carry out effects-based operations in lower spectrum of warfare is also an effective option to achieve the desired results. US Air Force operations are pan globe and they are available in open domain. All modern air forces today have studied the effects of effect based operations and parallel operations as a fallout. Now they are imbibing relevant lessons towards evolution of their own doctrines.

Escalation matrix in low-intensity conflicts is itself very obscure and a particular sect feels that adding the variable of air action in surface warfare further complicates the matter. During the research no example could be spotted in history which proves that a low-intensity battle has intensified due to use of offensive elements of air power. To give a fair chance to contrary belief that it could be because not so visible reasons and certain undocumented restraints, escalation management was also researched. Nevertheless, for future conflicts

there is no harm to have certain preventive measures in place for general escalation avoidance.

Escalation Management

A glance at world history and it is evident that war is inevitable. The older school of thought, regarding limiting wars, quotes straight-jacketed moral, political, economic, technical and human factors.[36] Modern strategists do talk of similar restraints but add more dynamism to it. Moral grounds are largely confined at a low key, placed on a lower pedestal especially in low-intensity battles with non-state actors. It is a matter of perpetual debate amongst various military scholars of whether low-intensity conflicts can be fought between two powerful states without it escalating into a conventional war. There are historical examples to prove the hypothesis either way, for or against.

In any conflict the escalation is governed by the breach of certain thresholds, which are decided dynamically by the forces involved. Thus, to avoid intensification of battle, the fighting forces have to decide on not breaching these thresholds, which is easier said than done. Firstly, it is difficult to identify them in the fog of war and it may also not be practical to fight a war with such constraints. This leads to the concepts to 'escalation dominance' and 'escalation avoidance'[37] towards escalation management.

Escalation Dominance and Escalation Avoidance

Escalation dominance is the result of a combatant discovering and effectively exploiting some asymmetric vulnerability in an opponent, thereby imposing some cost that the opponent cannot avoid and is not willing to bear.[38] One approach for seeking a measure of escalation dominance is to cultivate asymmetries in which the enemy is unable to respond in kind to an escalating act, for example, acquiring a class of weapon that the enemy does not possess.[39] Escalation dominance can be achieved by technological superiority, deterrence and coercion. Escalation avoidance on the other hand means to keep the low-intensity conflict confined and engage with the enemy in a limited and retaliatory manner keeping the force structure and force level well below that of the enemy.

However, there are various other means by which any perceived escalation can be checked and force asymmetry can be applied to achieve desired results. There are four broad categories namely political, diplomatic, economic and military (*Saam, Daam, Dand* & *Bhed*[40] sutra of 'Chankya Neeti' aptly describes them) in which various methods of escalation avoidance can be grouped. These methods, though not all encompassing are valid and effective for limiting any conflict. If policy or strategy makers 'appreciate' that there are chances of

escalation (due involvement of air power or otherwise) these methods can be applied.

Air power with its unique traits and modern day weapons can target the intended jugular vein of the enemy with pinpoint accuracy without any large-scale collateral damage. With careful selection of targets, weapons and platform, low-intensity conflict operations can be terminated early by using offensive air power. Such missions can actually hasten the achievement of conflict termination criteria. Offensive air power is utilised for strategic strikes, counter air campaign and counter surface force operations in any scale of operations and perhaps the most important contribution air power can make in a low-intensity, conflict operations setting is close air support. While studying various low-intensity conflicts, few offensive roles of air power that have not resulted in any escalation emerged out are as follows:[41]

(a) Surgical strikes using Precision Guided Munitions from a fighter/ unmanned aircraft.

(b) Delivery of stand-off weapons from an aerial platform.

(c) Suppressive fire by escorting armed/ attack helicopters.

(d) Retaliatory fire in self-defence.

(e) Low level high speed runs/ fire in near vicinity to disperse the gathering.

Conclusion

Military scholars worldwide believe that there are three major reasons that an all-out war is less likely to occur in the future. These are namely; economic globalisation, availability of nuclear weapons and interconnectivity of the world on both, the electronic and social media. However, there is no one who says the world is going to be peaceful, inspite of these inherent beliefs. Conflicts are part of human existence and they will always be there occupying the centre stage and continue to do so in the times to come. Ascertaining that full-fledged wars are less likely, one should realise that it follows that chances of low-intensity conflicts become more profound and likely than ever before.

When we talk about low-intensity conflict operations, it has to be understood that Air Power, is likely to be a part and parcel of any military response. There is a misplaced apprehension that use of the offensive elements of air power escalates the battle. The exact causes behind this are not very clear. The most probable cause can be the fact that Air Power is relatively new on the stage of battle orchestration. In Indian context, the Royal Indian Air Force was primarily created as a support arm to the Indian Army and its effective utilisation as a separate force is not part of the doctrinal evolution. At many instances in history

the Royal Indian Air Force/ IAF were not even any part of the actual campaign planning. It has never ever been considered as the 'first responder' and escalation was seen as a natural consequence of its employment.

Other than being a technologically advanced service, unique characteristics of Air Power like flexibility, responsiveness, reach etc should make it the first choice in response of a low-intensity conflict. Air power can be applied in the battlefield without mobilisation and concentration, close to the required projection area. Other than direct effects, use of air power has various indirect and psychological effects. Use of precision munitions, standoff weapons and long range aircraft minimises collateral and own damage in modern day battle fields. Air power can be effectively utilised in direct attacks on enemy centres of gravity, bypassing fielded forces, as described in the Warden's five ring model.[42]

Air power can be utilised in all offensive roles in a low-intensity conflict operations environment. Moreover, the understanding of offensive operations can vary from scholar to scholar. Some consider only fighter and attack helicopter missions as offensive while others include the otherwise support missions, like transport of combat ready troops as offensive operations. Keeping in mind the short, swift and intense nature of future localised limited conflicts under the overhang of nuclear dimension, use of Air Power can provide quick solutions.

Whenever there is a military response to a situation, it is generally understood that all other sources of National Power have already been exhausted. The chances of escalating the scale of battle are always there with or without the use of offensive elements of air power. It is in the interest of a state that a conflict is avoided at all costs and if it takes place, then it is limited in nature and terminated quickly. For escalation avoidance in low-intensity conflict operations, political, diplomatic, economic and military means have to be utilised.

In the Indian context, since the inception of the IAF, air power has been utilised in all low-intensity as well as full scale wars barring the exception of the 1962 Sino-India conflict. From counter insurgency operations in Waziristan to the Kargil operation, air power has proved its efficacy beyond any doubts. When we study all these campaigns and some of the United Nations missions that the IAF has undertaken, we can notice that there was no escalation of the scale of battle, solely because of the use of air power.

In the history of warfare since WW-II, air power has dominated the outcome of ground battles. It is now widely accepted that without some kind of control from the air, no ground operation will achieve the requisite degree of success in

the desired time frame. Use of air power thus becomes mandatory in swift conflict resolution. Whenever air power is used, it should be used in an offensive manner. If offensive elements are not utilised, then there is a chance of under-utilisation of the potent force. Further, to degrade the enemy's air potential, a personal air force is the best suited weapon. Enemy retaliation in terms of air attacks can be tackled by means of air defence again. The threat of enemy air action should not be considered as a deterrent for not launching our own air attacks, as the enemy can and will launch its air attacks irrespective of our launch.

In any battle, seizing of the initiative enhances the chances of victory. Thus, those who arrive first at the place of conflict are in a better position to take initiative. Those who arrive later must hasten into action, troubled. Thus, those who are skilled in conflicts will make the first move to prevent others from taking initiative.[43] Air power, due to its inherent characteristics of speed, reach and mobility, is better suited to seize initiative and be the first responder in low-intensity conflicts. Surface forces too must mobilise nearly simultaneously, not only to deter enemy from escalation but also to provide a conventional response if required.

Study of various low-intensity conflicts, wherein air power was used offensively, a few employment considerations emerged out they can be listed as follows:

(a) Clear political aim of the conflict with any associated restraints is required to be spelt out.

(b) Military objective, rules of engagement and conflict termination criteria is to be provided with.

(c) It is obligatory to place all air assets under a highest possible central authority. Planning has to be carried out together for all assets, even though execution may be decentralised.

(d) Accurate, timely and legitimate intelligence will form the bedrock for precise targeting.

(e) Avenues and medium of communication within inter-service elements are essential for effective orchestration of fire power.

Though there is a school of thought in India, which believes that the use of offensive elements of air power escalates the scale of battle, there is very less factual, historical or statistical information behind it. Air power, being the most suited force for rapid action, has to be a part of the response in limited conflicts. The Indian doctrine on low-intensity conflict can be drawn around the primacy of offensive air power; moreover, escalation avoidance is part of war-craft and it has to be carried out with or without use of air power.

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Book Review

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Reviewed by:

– Sahil Desai
Post Graduate Student in English Literature
School of Liberal Studies
Pandit Deendayal Petroleum University
Gujarat

"Where do we come from? Where are we going?".... These are the universal questions that most human beings have been trying to grapple with since centuries. Will we ever get the 'real' answer? Have we been successful in looking back thousands of years into history or a thousand years ahead into the future of mankind? No doubt, there have been many curious speculations about both of these pressing questions. But, can a scientist claim with full certainty that it all started with a big bang or can a faithful (or religious cleric) claim with all certainty that it all started with a breath from the God who created Adam and Eve?

In this particular issue, science and religion have always been at loggerheads with each other and this is the central theme of Mr. Dan Brown's 'Origin". Is the Creator God? or is 'today' the summation of just a simple scientific evolution? Mr. Brown has tried to explore this heavy topic in his latest fictional work titled 'Origin'. He is a modern American author famous for his titillating mystery thrillers. His iconic character, Mr. Langdon, a character that he repeats in most of his works, is a professor of Symbology at Harvard University, who always manages to strangely land in the middle of some unimaginable situation, the extrication from which needs an in depth knowledge of religious symbols, arts and mythologies. The respected professor is able to decode and decipher certain ciphers (which keeps the audience enthralled) leading the reader through an adventurous journey to a surprising end. Like always, from "Da Vinci code" to "Angels and Demons", Brown weaves his narrative very adeptly combining the ancient with the modern. Modern physical spaces and technologies are entwined with ancient, mostly religious symbols and ideas. Thus, he tries to take the reader through the complex world of tradition and individuality.

As in his last book *Inferno*, 'Origin' starts with a prologue. The prologue is always at the heart of his narrative. In this book, Edmond Kirsch, the famous scientist and futurist, has discovered 'scientific' answers to the questions quoted at the beginning of this article. He is supposedly all set for shaking the very roots of all the religions by broadcasting his discovery to the world. However, he is unable to do it. He is killed or rather assassinated before he gets a chance to deliver the answer, dragging the attention of the whole world towards his mysterious discovery. This is where our dear professor Langdon enters the scene. Edmond being his former student, he feels that it is his moral duty to break the suspense and release was all the answers as planned by his friend and student, Kirsch.

Ambra Vidal, the central female character in the book is the future queen of Spain, who also happens to be a curator of Guggenheim Museum, is in-charge of the 'Kirsch's event'. The Guggenheim Museum is actually located in Spain but Dan Browns description of its architectural wonders makes one to want to really visit it to confirm that it can really be so awe-inspiring. Ambra Vidal and Robert Langdon come together and decide to fulfil Kirsch's wish. Then, enter Winston…. How can we forget Winston? Winston is Kirsch's personal assistant, but, surprisingly, not a human. It is a computer bot or artificial intelligence (AI) created by Edmond Kirsch. It is this unimaginable leap in the field of AI that seems to be the central revolving theme of 'Origin'. Winston, the computer, almost seems human at times. Though purportedly 'programmed' by Edmond, it has such a marvellous programming with life-like abilities and emotions, that sometimes one wonders if Brown has gone a bit too far. The second half of the novel, shows Winston's undeniable presence which could easily be doubted for as that of a 'real' human.

On the other hand, the portrayal of the negative characters like Bishop Valdespino as well as the Jewish and Muslim leaders is somewhat unnatural. One really wonders if any such discovery, which may prove the origin of the universe, as otherwise than what religions believed, can cause any harm to religions or God, for that matter and shake the beliefs of billions of people, so much so that people are murdered over it. The whole idea of shaking of the world religions due to some scientific discovery seems exaggerated and the only weak link in Brown's story. Finally, after deciphering a 47 line poem of William Blake (a typical Brownian thing: ciphers and deciphering), they are able to release the video of Edmond's discovery worldwide.

In the end, the long-awaited climax shatters the really spell binding suspense. Not going into mathematical and technical details, the Edmond's discovery

proves to be a rectified version of the Miller Urey experiment. Seemingly, he has achieved answers to two questions. Where we come from? In simple terms, his answer is we come from a bio-chemical process and not from God. Where are we going? This answer is more terrifying. According to him, another 'species' will take over human beings in next few decades. Technology! Or artificial Intelligence! ... not very different from Winston who was instrumental in the assassination of his creator, Edmond at Edmond's request. Yes, Brown underlines the fact that technology is growing at such a speed, that after a few decades it will be entangled with human life. This book is a significant comment on the growing field of AI and serves more as a cautionary tale.

The book has also tried to explore the possibilities and limits of technological advancement. It reminds us humans, again and again of the moral check that we must all perform in order to preserve what defines us as human beings; our very 'humanness'. It is also a very sharp comment on the field of Artificial Intelligence. Finally, it asks us certain questions. Will the dystopian world of machines without human hands come true? Will the machine start thinking? Should we develop AI without any check? What is a human without faith? It is interesting to note that, in the end, Langdon takes a sigh of relief when he is away from Winston, the AI bot. He feels 'human' again. The last question which the book asks and which gets imprinted on our sub consciousness is, "What if machines stop?"

Azeem Ibrahim, *The Rohingyas: Inside Myanmar's Hidden Genocide,* (New Delhi: Speaking Tiger Publishing Pvt. Ltd., 2017), Price: Rs 600.00, Pages: 235.

Reviewed by:

— Ryan Mitra
Under Graduate Student in IR
School of Liberal Studies
Pandit Deendayal Petroleum University
Gujarat

The 2017 version of *The Rohingyas: Inside Myanmar's Hidden Genocide* by Azeem Ibrahim is a comprehensive and compelling account of the centuries long travesties and crimes committed against the ethnic groups in the Burmese region, mainly focusing on the ethno-religious group that are identified as the Rohingyas.

The Rohingya crisis came into the global spotlight due to the mass exodus that occurred in the Rakhine State of Myanmar in 2012, due to the hate crimes being committed against this ethnic group. Villages being pillaged, houses being burned down, unrelenting and irrevocable bloodshed, violence and death is the omnipresent environment in the region since the advent of this decade, which has raised three principal questions that the book cogently attempts to answer: Who are the Rohingyas? What are the reasons behind such inhumane treatment and operations against them? What can be and has been done to rectify or make amends for this dreadful situation? Ibrahim tries to break down the book into three parts, where he covers the history of Myanmar, and traces the Rohingyan presence in it, the current political climate, and the international mechanisms that can help relieve, if not solve, this crisis.

The Myanmar government has established a rhetoric around the Rohingyas; of being aliens, stating that they are originally immigrants from India, and now Bangladesh, who were brought in during the colonial period by the British to aid with trade and labor and the government has actually termed them as 'Bengalis,' thereby refusing to even acknowledge their ethnic identity. The Myanmar nation-state wishes to be constituted by ethno-religious groups that

have been present in the region before colonial times; organically and naturally. This book delves into the history of the region and scrutinizes the false accounts presented by the Myanmar government, by providing a compelling and well researched account on the the presence of the Rohingyas in the Rakhine region, that was previously known as 'Arakan'.

The book delves into early colonial records, showing viceroys noting the presence of ethnic groups similar to the Rohingyas, far before the advent of the Buddhist population that is now in power in the State. Furthermore, it objectively fills in the gaps in the historical timeline about the physical presence of the Rohingyas, and provides a cogent reasoning as to why they had been disconnected with the rest of world during the 16th, 17th, and 18th centuries. Whilst tracing their history, Ibrahim actively tries to show how the Rohingyas have been a part of the fabric of the Burmese nation-state right from the times of kings and kingdoms, and only due to sheer geopolitical events and circumstances have been alienated from this fabric; torn apart from their cultural and historical roots, therefore being left without any identity, or a socio-cultural base. The book does an exceptional job in setting up a chronological series of events and eras that clearly place the Rohingyas in the Burmese nation long before the colonial period, therefore putting forth strong contradictions to the rhetoric of the Myanmar government about the Rohingyas' xenogeny.

After creating a fundamental base supporting the original history of the Rohingyas, the book progresses by eruditely juxtaposing the established, static facts in history and the treatment dealt out to them based on false pre-suppositions, personalized and ideologically driven agendas, and that too, largely in the interest of populism and religious majorities. The book objectively analyses the current political scenario from a perspective different from the one picked up by mass media; it delves into the rationalism and ideology held by the governing forces in the State. The book makes note of the Buddhist homogeneity that the State apparatus has tried to achieve under the influence of the 'Theravada' Buddhist philosophy. With the overt narrative of the government; about the origins of the Rohingyas, broken down with the primary part of the book, this part looks to investigate into the crimes committed against the Rohingyas in recent times whilst addressing the utter possibility of more malicious, generalized, and anachronistic motives lying underneath such State practice.

The book analyzes all governments – both, dictatorial and democratic under the same lens, and finds them at fault on similar grounds – populism. Religious populism has always been and is the principal driving force in the politics of Myanmar, and all the parties in the current political environment continue to

exploit this narrow perspective of the masses, at the cost of the basic human rights of the Rohingyas being violated. The travesties and the systematic persecution, that the Rohingyas have been privy to has led to families and communities being torn apart, long cultural settings being uprooted, and an entire nation being forced out of their own ancestral land, all of which, Ibrahim argues, based on the grounds of misconceived facts, intentional negligence and State-wide populist propaganda. It can safely be assumed that while addressing such a heart wrenching and tragic crisis, an element of hubris, and idealism would have naturally surfaced. The objectivity shown by Ibrahim in this part of the book is fairly commendable. He continuously navigates around his hubris, and presents a stark account of why these operations are not only misplaced and unjustified, but also how the Rohingyas are being subjected to an unnecessarily obtuse, and anachronistic ideology that continues to be omnipotent through State-governed institutions.

The objectivity shown by Ibrahim for the previous two parts of the book starts to dwindle once he addresses international reactions and international laws pertaining to this crisis. The objectivity and realism that is clearly on display in the first two parts, is awkwardly transformed into basic idealism while talking about international law and criticizing the stance and positions that other States have taken. Presenting the impact that neighbouring States have faced due to a mass influx of fleeing refugees, he goes on to equally compliment and criticize, how other States have reacted to the situation. Countries like Thailand and Australia have faced the brunt of his criticism due to their nationalist and protective policies of turning away any incoming refugees, whereas he wholeheartedly acknowledges the work and input of States like Bangladesh and Malaysia, who have been sympathetic to the plight of the Rohingyas.

Ibrahim also speaks of Myanmar's political and economic relations with States like India, and how these relations could be used to curtail these heinous acts in the Rakhine state and reel back the crisis. The most prominent gaping hole that is present in the book is while addressing international laws pertaining to this crisis, mainly that of genocide, crimes against humanity, and non-refoulment. Ibrahim's two-chapter long tirade on international law is devoid of the serious considerations and nuances in international law that deal with such sensitive crimes. There is a very fine, but established line between what kinds of acts are to be deemed as genocide and as crimes against humanity. A 7-point metric on which different heinous acts are established and if any one such act is undertaken against a particular group in the sole interest of destroying and eliminating the said group, it is deemed as an act of genocide.

This metric has been established by the UN Convention on Genocide, and has been acknowledged multiple times by the International Court of Justice, and other international legislative bodies. The author mentions this metric, but in a very skewed and biased manner placing his arguments to fit the necessary criterion for these acts to be deemed as genocide, whilst ignoring the fundamental necessities and interpretations that have been observed in past cases dealing with similar crimes. There is an obvious and clear gap in the understanding about the mechanisms that work in international law, and the observations that have been established in precedence, that astutely articulate which specific incidents can be termed and claimed as genocide. Ibrahim vehemently tries to justify the title of his book from various angles-political, social and legal. Even though he makes a very convincing argument in favor of the first two, he fails to satisfactorily communicate an adroit account of legal provisions and arguments that can prove that the acts committed in Myanmar, against the Rohingyas, do paramount to acts of genocide.

This attempt to show to the world the serious depravity that has ensued in the Rakhine state is highly commendable, and even though this is not an absolutely consummate work of political investigation due to its flaws in the latter end of his project, Ibrahim has presented a comprehensive exposition on the crimes against the Rohingyas, irrespective of it being classified as genocide or not.

D Ravindra Prasad, et al., *Administrative Thinkers*, (New Delhi: Sterling Publishers Pvt. Ltd., 2017), Price: Rs. 350.00, Pages: 310.

Reviewed by:

— Ritwika Verma
Under Graduate Student in Public Administration
School of Liberal Studies
Pandit Deendayal Petroleum University
Gujarat

With the expansion of the discipline of public administration, the need for literature on administrative theory is being increasingly felt. This book is an attempt to fill this gap; albeit in part. The book provides an account of the ideas and contributors of twenty-one thinkers to the discipline. Each chapter covers an outline of the thinker's life, writings, principal contribution to the theory and a critical evaluation. This volume is weaved the study and teaching of public administration, political science, sociology and management. It offers a single source of reference on the theory of public administration; particularly the contribution of select thinkers. In this second and revised edition one chapter on administrative theory and two thinkers have been added. All chapters have been revised.

Kautilya's Arthashastra mainly discusses three aspects of the science of public administration, viz., the principles of public administration, machinery of government and management of personnel. He gave the concepts of Monarchy as the best form of government, Absolute powers to King, Saptanga theory of elements of state along with principles of public administration.

Sun Tzu's *The Art of War* written over 2500 years ago to date remains one of the most influential works ever produced. It talks about the concepts of mission, vision and purpose as the common denominators binding the organisation, strategy, leadership and their qualities, information management, process of decision making, responsiveness to the institutional environment, flexibility needed to adopt in crises, conflict management, etc., these treatise form the basic tenets of modern government.

Woodrow Wilson was a Former President of America and Political Scientist. Wilson's ideas of significance of study of administration as science, politics and administration dichotomy along with public administration as 'Government in action' are also discussed.

The book then moves on to talk about the Classical Thinkers and their perspectives. The classical, or structural, theory of public administration does not normally admit of multiple theories, but centers around a complex set of variables, ideas and concepts that govern public administration, or state bureaucracy. Classical administration theory centers round the 'division of labour'. This theoretical approach defines "modernity" as the increasing specialization of labor. This means that a central bureaucracy must exist that keeps these functions coordinated and connected through an impersonal chain of command.

Classical Thinker, Henry Fayol the French engineer regarded as the father of classical theory, defined authority as "the right to give orders and the power to exact obedience". His principles of management along with the general theory of management which includes the gang plank jumping concept.

FW Taylor also called the father of scientific management talks about the principles of scientific management, functional foremanship, etc.

Gulick and Urwick go on to identify the four bases of departmental organization as purpose, process, persons and place or the 4-P formulae, they also coined acronym POSDCORB.

Lastly, the classical perspective includes the work of Max Weber a German Sociologist and Political Scientist who gave the form of authority, legal-rational bureaucracy and protestant ethic.

The book then moves on to thinkers beyond the Classical Perspective. The authors that came under the post-classical theorists were plenty. Important work had started happening in the areas of Human Relations by the likes of Elton Mayo, his Hawthorne experiment threw interesting light on social and psychological forces in work situations. So the importance of attitudes, feeling, sentiments and social relations, work group dynamics etc started influencing the vey formal structure and way of working; present and preferred by the public organizations.

Mary Parker Follett, who was a bridge between the classical approach and the behavior-human relations approach to organization, discussed constructive conflict, integration, and depersonalising orders.

George Elton Mayo the founder of human relation movement- mostly concerned with analyzing the problems of fatigue, monotony, morale, work environment and their impact on the worker. He focused his attention on the behavior of the workers and their production capacity keeping in view physiological, physical, economical and psychological aspects, called this approach a clinical approach.

Chester Bernard regarded as the spiritual father of the social system school gave the concept and principles of formal organization as a cooperative system. Three elements he gave were communication, willingness to cooperate and common purpose.

Herbert Simon talks about administration as decision-making, bounded rationality and zone of acceptance. Abraham Maslow gave the hierarchy of needs, self-actualisation and peak experiences. Douglas McGregor gives the theory "X" and Theory "Y" along with discussing the management education from cosmology to reality and giving the transactional influence.

Chris Argyris focuses on the Maturity – Immaturity theory, T-Group techniques, single loop and double loop learning and organisational learning. Rensis Likert gives the Management systems and Linking pin model.

The Post-Classical Thinkers gave way to some new wider perspectives which includes many thinkers like; Fred W. Riggs gave the prismatic society and Sala Model of Administration and development as diffraction and integration.

Dwight Waldo, an American political scientist and "defining figure" in public Administration looked at public administration as political approach, gave the professional orientation to public administration and the concept of New Public Administration. Yehezkel Dror gave the societal direction system as a mega-knowledge system and "Optimal Model" of policy making along with paradigms of policy science. Lastly, Peter Drucker looked at Management by objectives and talked about restructuring government or New Public Management along with Knowledge society and knowledge workers.

Towards the end, the book discusses the contribution of Karl Marx and Bhimrao Ramji Ambedkar. Karl Marx was a German Revolutionary Philosopher and Political Economist. He viewed bureaucracy as an exploitative class instrument, gave a materialistic interpretation of history and promoted the alienation of bureaucracy.

BR Admbedkar's social justice view of state and administration provided a new perspective to understand the casual factors of administrative structure and practices. His socio-political vision can be summed up as social justice.

Ambedkar viewed social justice as a goal, constitution as a mediating system and state and administration as agents of change.

With the advent of technology in every walk of life and a common consensus amongst authors and scholars that both public and private administration are similar in many manner, the management science approach to public management has into existence. The newest approach is that of policy analysis approach since the government is venturing into new areas and different activities with increased involvement in welfare programs, the process of making public policies and its analysis, the measurement of the output etc became the new areas of study for the scholars and subject matter experts.

The thinkers included in this volume have through their studies and researches, generated a large number of ideas, concepts and theories and wrote extensively on organisation, administration and management. Over the years the book gained recognition and has become a compulsory reading to the students and scholars of public administration. It is also an important source book for those appearing for the competitive civil service examinations at national and state levels in public administration and management.

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