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RESEARCH ARTICLE

Daily Newspapers' views on Defence Science & Technology in India

PHULDEEP KUMAR
Scientist, DESIDOC,
DRDO, New Delhi, INDIA
E-mail: phuldeep@gmail.com

and

HARISH KUMAR
Professor, Department of Journalism & Mass Communication,
Maharishi Dayanand University, Rohtak, INDIA

ABSTRACT

This study investigates the coverage of Defence Science & Technology (DST) and related areas in Indian national newspapers published from New Delhi. Thirteen English-language national dailies and three Hindi-language national newspapers' contents have been analysed. Number of news items published is quantified. The news items are analysed on basis of their sources, formats, biasness, area of coverage, and number of words.

KEYWORDS: Defence Coverage, Science Communication, Content Analysis, Science News.

Introduction

Defence Science & Technology (DST) arguably constitutes both scientific and economic area of growth and progress. Defence preparedness has always been a high priority area for every government in this modern world. A considerable portion of Gross Domestic Product (GDP) has been constantly earmarked for defence budget by various countries. The defence budget of top six countries according to IHS Jane's Defence budgets annual report 2015 is US ($569bn), China ($190.9bn), UK ($66.5bn), Russia ($53.2bn), France ($52.7bn), and India ($ 49.7bn) (IHS Jane Report, 2015). Apart from India other countries in this list are also big exporters of arms and ammunition. India does not figure among top twenty defence exporters in the world. In terms of GDP India's defence budget is 3.9% of GDP in 2015-16

according to IDSA. India imports nearly 70% of its defence needs and rest 30 % are met internally (Behera, 2015).

Government is promoting indigenous manufacture of defence equipment by promoting private public partnership. Government has consistently increased the FDI limit in Defence sector, now it has been raised to 100%. Indian defence R&D sector is very robust with 53 DRDO labs working on cutting edge defence technologies to deliver world-class weapon systems. India has third largest military in terms of number of defence personnel.

The Defence Science and technology (DST) can be defined as processes, experiments, know how, equipment, systems, sub-systems, integration, testing, simulations, chemicals, designs, prototype building, interaction of processes, validation, certification involved in production of weapons.

DST can also be defined as science and technology involved in design, development, testing, validation, and manufacture of defence equipment and systems. This also involves other aspects such as physiological and psychological aspects of a soldier, the human machine interface, all other aspects which help the soldier accomplish his task successfully in the battle field such as protective gear viz, bullet proof jacket, helmet, gloves, specially designed shoes to protect from snow, the tent material, the parachute, etc.

DST encompasses a wide gamut of processes, products and technologies. The strategic relations are also considered as part of DST. The political happenings, which may have bearing on military equation, preparedness, acquisition of weapons, etc., are also taken as part of DST related news. These are widely covered and reported in various media. Our focus here is restricted to the coverage of news items related to DST in newspapers.

The science and technology policy of 2003 aims at ensuring the information regarding scientific developments reach every individual so that progressive and enlightened society with scientific attitude may emerge which can reap benefits of science and technology in their everyday life.

Literature Review

Science communication by various media, its presentation, framing, efficacy, impact, public interest and understanding,

controversies, and benefits have been the areas which have long attracted attention from communication scholars (Cronholm and Sandell 1981; Grunig 1974; Jerome 1986; Lewenstein 1992; Weigold 2001; Raza et al., 2002).

The medium itself affects the quality and amount of science news. Most in depth coverage is done by newsmagazines, followed by large national newspapers. Wires, small dailies, and broadcast stations lack such coverage due to paucity of financial resources (Ward, 1992). The authors were of the view that scholars would have elaborately investigated scientific, economical, political, and social aspects of defence related issues, but to our utter surprise there are hardly any studies available. Not even one research article about coverage of DST in Indian context could be found. So, here we are reviewing science coverage by media as it also includes DST.

In Indian context, newspapers seem to have edge over internet in terms of reach and user friendliness to the masses as income and education levels are low and internet access is still costly. Nelkin (1987) also emphasized that newspapers are the only sources of information about science and technology for large part of human population and such reportage is believed by huge population as absolute truth. Newspapers with large circulation are more likely to have a science beat and hence provide better coverage. News organizations also rely heavily on each other for ideas. Gans (1979) reported that editors of small newspapers read big newspapers such as New York Times and Washington Post for story ideas for sake of convenience. This function of 'newsworthiness judgement' has been described by media scholars as "inter media" agenda setting (Shoemaker and Reese, 1991).

Defence has been area of predominant interest of political class since ages. The military superiority dictated the contours of map of this world before this century. In last decade there has not been full-fledged direct war amongst any two countries, but still the defence preparedness is one of the prime concerns of every government in this world. Media coverage of defence issues to a large extent informs policy decisions. Rioux (2004) examined how opinion in the Quebec province is shaping Canadian defence policy. Kandyla & Vreese (2011) did cross-national comparative content analysis of the broadsheet press coverage of EU common

foreign and security issues. Sadiq & Qureshi (2010) studied coverage of nuclear proliferation issue in two English and two Urdu dailies published from Pakistan. The results show that all newspapers have given extensive coverage to the issue. Thiebaut (2008) has analysed European defence media coverage in three daily French national newspapers and two daily British newspapers. He found that French and British newspapers have differences of opinion with regards to European defence.

Newer science communication models are emerging. Lewenstein (2005) described four models for science communication: deficit model, contextual model, lay expert model, and public participation model. In public participation model communication about science takes place among diverse groups, so that all can contribute, and that all can have stake in outcome of deliberations. Newspapers function predominantly on basis of this model as they provide ample space for generators of science, exploiters of science, users of science, and policy makers of science. Journalism is not supposed to present solely the opinion of scientific experts but also preferably of every social group affected by technology in consideration. Media is not technophobic but it generally reflects the current social context (Metag, 2014). Many studies points to conclusion that researchers communicate with masses for three reasons: (a) they do so to justify themselves in the public arena under political pressure. (b) journalists are in constant need of experts as they can provide legitimacy and credibility to the science stories. (c) They also feel the necessity of telling people the value they are generating as duty towards the taxpayer (Wein, 2014).

Science reporting by the media often involves complex and contested issues characterized by danger and probability. Also, economic, political, ethical, and social aspects are evaluated. Media coverage of new technologies have been found appreciative and also found critical in many studies. The assessment so arrived has been based on comparisons of media coverage with real world indicators or expert risk assessments (Metag, 2014).

Indian communication scholars have also studied various facets of science coverage in Indian media. Patairiya (2009) found science coverage in print media is 3.4 %, TV 2.18%, and Radio

5.84%. Dutt & Garg (2012) reported among Indian English – language newspapers times of India is leading in terms of coverage of science related news. Kumar (2013) has pointed towards wide gap in Hindi and English newspapers science coverage. The English newspapers were way ahead. Bhatta, et al, (2015) compared climate coverage in The Times of India, the Hindustan times and the Indian express and reported 'The Hindu' is a leading daily in such coverage. Dutt and Garg (2012) analysed content of 'The times of India', 'The Hindu', and 'The Pioneer' and reported less than one percent space is devoted to science as compared to total available space. Vigyan Prasar in an extensive study of 52 newspapers over a period of two months reported 4.3% science items in English dailies and 2.5% in Hindi newspapers (TALEEM Research Foundation, 2000).

Research Design and Methodology

Content analysis uses both qualitative and quantitative methods to make inferences from given information. Qualitative content analyses is used to examine the differences between latent and the manifest content (Guillaume & Bath, 2008). Thirteen English-language national dailies and three Hindi-language national dailies with wide readership base have been selected for this study. These being the leading newspapers they also have agenda setting function for largely other smaller readership newspapers, Hence are representative of broader national consensus view on various aspects of DST. The newspapers are 'Navbharat Times', 'Jansatta', and 'Punjab Kesri' (Hindi Dailies) and DNA, 'Mail Today', 'Business Standard', 'The Economic Times', 'The Indian Express', 'Times of India', 'The Hindu', 'The Pioneer', 'The Tribune', 'Hindustan Times', "The Asian Age', 'The Statesman' and Deccan Herald (English Dailies). The period of study is entire month of February 2014. All the newspapers were manually scanned for DST related news, views, opinions, and editorials on daily basis. The political, social, economical, and scientific aspects of defence are included in studying coverage of defence science and technology, as this may have direct and indirect bearing on DST advancement. Quantitatively for each news item the data regarding date of publication, weekday of publication, newspaper of publication, illustration presence, and number of

words in news item were coded. Qualitatively each news item is read to ascertain format of news item, source of news item, area of coverage, approach, presentation, bias, main actor/subject of news item, and level of reporting were coded. The census method was adopted, i.e., every news item meeting the set criteria was coded. The data so gathered has been put through SPSS software. The limitation of this study is that the same news items appearing in different newspapers is taken only once.

Results

A total of 231 news items were found in all sixteen newspapers which pertained to defence science and technology and its various dimensions. Thirteen of these are English newspapers and three are Hindi newspapers. The results obtained after compilation of data and analysis using SPSS software are as follows:

Occurrence of Defence Science and Technology news (Newspaper wise):

News reports, articles, editorials, opinion columns, analysis, and interviews published in newspapers help common man visualise and understand the happenings and future possibilities in various areas. The sixteen newspapers, under study are a mixed bag regarding coverage of DST and allied areas. The average number of DST stories is 17.15 for English newspapers and 2.6 for Hindi newspapers for the entire month, which shows a huge difference between the two. But as the numbers of English newspapers are 13 and Hindi newspapers are three, we cannot say so conclusively.

Among the English-language newspapers The Times of India published 42 news stories, which is 18.2% of all news stories that appeared in all of the newspapers. At second place is Indian Express with 33 news stories, i.e., 14.7% of the total. At the third place is Business Standard with 24 news stories, i.e., 10.4% of the total. Among the English-language dailies which gave poor coverage to DST are DNA, which published only one news item, i.e., 0.4% of total. The Economic Times with 4 news stories, i.e., 1.7% of the total comes second from bottom. Hindustan Times is third from the bottom with 8 news stories, i.e., 3.5 % of the total. Among Hindi-language newspapers Navbharat Times gave most coverage with 5 news stories, i.e., 2.2 % of the total. Jansatta published only 3 news stories, i.e., 1.3%, and Panjab Kesri did not

published any news item. It has been observed that overall coverage of DST is reasonable by Indian press, when we consider the fact that DST is an area where everyday news is less expected.

Table 1 — Occurrence of DST News (Newspaper-wise).

Newspaper	Frequency	Percentage
1. Mail Today	11	4.8
2. Business Standard	24	10.4
3. Economic Times	4	1.7
4. Hindu	17	7.4
5. Indian Express	33	14.3
6. Times Of India	42	18.2
7. Pioneer	17	7.4
8. Tribune	22	9.5
9. Hindustan Times	8	3.5
10. Deccan Herald	19	8.2
11. Asian Age	14	6.1
12. Statesman	11	4.8
13. Navbharat Times	5	2.2
14. Jansatta	3	1.3
15. DNA	1	0.4
16. Punjab Kesri	0	0
Total	231	100.0

Specific Topic of News Item

Newspapers are mirrors of happenings around the world. They report what their editorial boards feel worth some value to their readers. During this period and just before naval mishaps took place. Navy affairs otherwise are lesser reported as compared to other defence stories, but this time around it gained prominence because of the ‘mishaps’. All news stories were read to find the main topic covered in them. Most number of stories were about Navy 31(13.4%). Defence preparedness related coverage got second most attention of journalist 26(11.3%). China got third most attention with 23(10%) news published. This shows that

Indian press is keen to tell countryman about defence preparedness of India and its perceived competitor China. Defence exposition, which is a biannual event, also got good attention of press with 15(6.5%) news stories. Among the weapons Agni missile got most attention with 8 news stories, i.e., 3.5%. Other missiles and Brahmos were overall second with 5 news stories, i.e., 2.2% of the total. During this period press has been found to have given due attention to diverse factors of DST.

Table 2 — Specific Topic of News Item

Area of coverage	Frequency	Percent	Area of coverage	Frequency	Percent
Afganistan	1	.4	IAF	10	4.3
Agni Missile	8	3.5	INS Sindhuratna	2	.9
Agusta Westland	3	1.3	Iran	7	3.0
Akash	4	1.7	Israel	1	.4
Arjun Tank	1	.4	LCA	3	1.3
Army	4	1.7	Missile	5	2.2
Artillery	1	.4	Navy	31	13.4
bio digester	1	.4	Nepal	1	.4
Brahmos	5	2.2	Nirbhay Missile	1	.4
China	23	10.0	North Korea	4	1.7
Cyber Security	4	1.7	Nuclear Deal	4	1.7
Def. expo	15	6.5	Nuclear Weapon	2	.9
Def. Helicopter	1	.4	Ordnance Factories	1	.4
Defence	26	11.3	Pakistan	3	1.2
Defence Budget	7	3.0	Radar	1	.4
Defence Ministry	2	.9	Rafale	3	1.3
Defence Procurement Po	1	.4	Rifle	1	.4
Defence R&D	3	1.3	Russia	2	.9
Defence Weapons	1	.4	Saudi Arab	1	.4
Dhanush	1	.4	Submarine	3	1.3

DRDO	13	5.6	T 90 Tank	2	.9
Electronic Display	1	.4	Tank	1	.4
F-35 Fighter jet	1	.4	Tatra truck	2	.9
Fighter Plane	1	.4	UAV	1	.4
HAL	1	.4	UK	1	.4
Howitzer	1	.4	US	8	3.5

Weekday-wise Distribution

Newspapers generally have more number of pages in their Sunday edition. As this day being holiday, readers have more time to spend reading a newspaper. We started the study on hypothesis that more DST news may appear on Sundays. The results were contrary to the view, most DST related news stories were published on Friday (22.5%) followed by Thursday (18.6%), and Wednesday (34%). In fact least number of news stories related to DST were found in Sunday editions (7.4%), which rejects our hypothesis. Hence it could be inferred that newspapers tend to cover DST news as they happen.

Table 3 — Weekday-wise distribution of news

Day	Frequency	Percentage
Monday	29	12.6
Tuesday	29	12.6
Wednesday	34	14.7
Thursday	43	18.6
Friday	52	22.5
Saturday	27	11.7
Sunday	17	7.4
Total	231	100.0

Format of the News Item

Newspapers publish stories in various formats such as news report, article, analysis, interview, editorial, and pictorial. News stories of all sixteen newspapers are quantified among these categories. It is evident that favourite form of reporting is in news form (52.4%) followed by article (30.3%) and analysis (14.7%).

Only one editorial appeared about DST. Only two interviews, and three news in pictorial format were published.

Approach towards News Item

DST coverage provides an ample scope for covering various aspects of DST. The underlying principles/mechanisms/processes can be written about as there is ample space in newspapers to do so. But this opportunity seems to have been not taken by the journalists, rather almost all the news stories were covered in general manner barring one. This can be inferred that journalists don't have much interest in exploring the technologies involved in reporting about weapons. This also points to the fact that journalists may not have formal science education to do so. Palen, (1994) has reported that only few journalists covering science have science backgrounds. Though his study is for US and is twenty-two years old. But we think this holds true for India even today.

Way of Presenting the News Item

While reporting news stories, journalists have an opportunity to drive home the message they are conveying in befitting manner. This aspect has been found to be adequately explored by the journalists. The news stories which were accompanied by elaborate descriptions were taken as interesting and the news stories which just gave account of happenings were taken as informative. As more than half (50.2%) of the stories reported news in an interesting manner and 49.8% news stories were just informative.

Overall bias towards Defence Science & Technology

In this study, all the news were read to find their orientation towards furtherance of DST. The stories were quantified as positive, negative, and neutral. The positive stories were those which were supportive of advances in defence science, the organisations involved in defence design and production (such as, DRDO, HAL, Goa Shipyard, OFB's, BEML, private industry, etc.), the government policies (such as, more funding, openness to FDI in defence, bilateral cooperation in defence, more incentives for armed forces, acquisition of modern weapons, etc.), and

strategic analysis, which view defence preparedness as one of the major attributes of a progressive nation.

The negative stories are those, which are critical of the above developments. The neutral stories are those, which do not favour or criticise, they just objectively narrate the story. It has been found that 48.9% stories were positive. This indicates that a large section of journalist view defence as important sector of enterprise in country. The negative coverage of 28.6% indicates the journalists are also questioning the defence establishments efficiency, effectiveness, and their conduct. The neutral coverage of 22.5% indicates that happening were reported in an objective manner without taking any sides.

Newspapers gather news from news agencies, their own journalists, other media sourcing, and by freelancers. Defence is an area where world over secrecy has been observed. The journalists and general people are not welcome at defence establishments. So getting news about defence is tough. Seldom first-hand accounts are available. Journalists generally receive news from public relation departments of the defence establishments and press releases by the government itself. This is also evident from the study that 45.9% news published are anonymous, with out mentioning any source. Most news appeared are by name, i.e. 50.6%, these are published by journalists, who predominantly cover defence. These journalists gather information from various sources and present them with their inputs in exhaustive ways. Only 2.6% of the total news were from staff reporters. Only two news reports identified agencies, but while examining the news stories almost same content has been found to be published by newspapers with minor variations, which points to the fact that news might have originated from the agencies but was published without giving credit to them.

Author-wise Distribution of the News Item

As more than half the news stories about DST were published by name. We quantified number of news stories published by individual journalists. It was found that Rajat Pandit has been the most active journalist with 14 news stories, i.e., 6.1% of the total. After him are Ajai Shukla (3.9%), and Manu Pubby (2.2%). 39 individual journalist have written one news story each. Two news

stories each has been written by 13 journalists. Three news stories each has been written by four journalists, and only three journalists have written four stories each. This also exposes the fact that in India there are few journalists, which have some expertise in defence.

Illustration with News Item

When a picture is given with a news story it adds to the credibility of the news. Among the DST news published in the period under study 91.8% were without picture, only 6.9% were published with picture, and 1.3 % were published with graphics. This again reiterates the fact defence is secretive affair, in which very less visual information is available.

Main Actor/Subject of News Item

While quantifying the news items they are grouped in four broad categories. Equipment/product category includes news, which talk about a specific weapon, facility, and organisation. In the category scientist, news which report about the budget, finance, FDI, privatisation, etc., are clubbed. In geopolitical category the news, which involve analysis of more than one country are taken. The majority of news items focused on equipment/product (48.1%). The politics of defence between different countries, i.e., geopolitical news (26.4%) scores second. The evaluation and reporting of government policy regarding DST is not far away at 22.5%. The people involved in defence R&D, production, maintenance, and the final user, were almost absent from reporting, only they were mentioned in only 3% coverage. This points towards the fact that people from defence establishments are not available for media interaction.

Table 4 — Main actor/subject of news item.

Main Actor/Subject	Frequency	Percentage
1. Equipment/Product	111	48.1
2. Scientist	7	3.0
3. Govt. Policy	52	22.5
4. Geopolitical	61	26.4
Total	231	100.0

Level of Reporting

Defence is an area in which if any country does a new invention or develops a new weapon, it catches global attention. Indian press has also covered defence related world-wide news, as progress in this field elsewhere do have ramifications for India also. It has been found that not even a single defence related news item is covered at regional level. All the reporting was found either at national or international level. The national level reporting was 66.7% and international level reporting was 33.3%. This reveals the fact that in India there are enough activities going on in field of DST which are considered worth reporting. Indian press has also shown keenness in reporting international conflicts and DST developments in other countries. US, Russia, Pakistan, North Korea, Iran, Israel, UK, Nepal, and Saudi Arab are reported about yet China remains the focus for most news papers.

Depth of News Stories

Extent of coverage can be gauged by the number of words published per story by any newspaper. The more the number of words published more is the coverage, i.e., various aspects of the news stories are highlighted and analysed. In this table Hindi newspapers are committed as we have no software available to count their words correctly. The English news items were pasted in MS Word to know the number of words for each story. The table shows the minimum number of words and maximum number of words among all the news stories for that particular newspaper. The shortest story is found to have appeared in Mail Today (57 words). The largest story is found to have appeared in Indian Express (2857 words). Looking at the mean of the news stories the business standard has the highest (687.21), which means that usually Business Standard has published stories with maximum number of words. The Pioneer scores the second (570.59) and Deccan Herald is third (566.11). Hindustan Times has the least mean, which means this newspaper generally published the DST news in lesser detail. The standard deviation for Indian Express was found maximum meaning thereby. It has the maximum spread of DST coverage.

Table 5 — Newspaper-wise Statistics of number of words of each news item.

S.No.	Newspaper	N	Minimum Words	Maximum Words	Mean	Standard. Deviation
1	Mail Today	11	57	1021	361.36	321.512
2	Business Standard	24	177	1237	687.21	263.933
3	Economic Times	4	223	398	312.25	83.552
4	Hindu	17	198	681	438.59	163.167
5	Indian Express	33	126	2857	420.76	461.566
6	Times of India	42	186	1311	457.02	202.393
7	Pioneer	17	171	1129	570.59	332.285
8	Tribune	22	136	1824	511.45	447.791
9	Hindustan Times	8	110	411	268.13	106.065
10	Deccan Herald	19	151	1262	566.11	368.617
11	Asian Age	14	147	713	358.50	168.020
12	Statesman	11	215	1274	515.45	293.809
13	DNA	1	447	447	447.00	-.

Newspaper-wise Distribution of Journalist

As the number of news stories by individual journalists were more than half. It was examined that for which newspaper they write. The table presents newspaper-wise the journalists writing about DST for them. It is observed that Gurmeet Kanwal and Harsh V pant are only journalists who have written more than one paper. Hence we can conclude that generally journalists are engaged by particular newspaper to write about defence science and technology related areas.

Table 6 — Newspaper-wise Distribution of Journalist

Newspaper	Authors
1. Mail Today	Gautam Dutt, Jugal R Purohit, Manoj Joshi, Shiv Aroor
2. Business Standard	Ajai Shukla, Amit Chhangani, Ankit Panda, Ashok Parthasarathi, Gireesh Babu, Gurmeet Kanwal, Laxman K Behera, Pranav Kulkarni, Premvir Das

3. Economic Times	-
4. Hindu	Ananth Krishnan, Atul Aneja, Devesh K Pandey, Gaurav Vivek Bhatnagar, Laigh A Khan, S. Anandan, T.S Subramanian
5. Indian Express	Anantna Krishnam M, Gili Cohem, Hemant Kumar Rout, Huma Siddiqui, Jatinder Kaur Tur, Manu Pubby, Rahul Bedi, Shikhar Gupta, Subhajit Roy, Surabhi
6. TOI	Deeptiman Tiwary, George Jahn, Indrani Bagichi, James Vincent, Josy Joseph, Rajat Pandit, Rajat Pandit & V Narayan, Subodh Ghildiyal & Rajat Pandit, V Narayan
7. Pioneer	Abhijit Iyer-Mitra, Chintamani Mahapatra, G Parthasarathy, Priyanka Dua, Rahul Dutta, Rahul Dutta & Mohit Kandhari
8. Tribune	Ajay Banerjee, Arteev Sharma, Ashok Tuteja, Dinesh Kumar, Harsh V Pant, Manoj Joshi, Vijay Moham
9. HT	Rahul Singh, Shishir Gupta, Sutirtho Patranobis
10.Deccan Herald	Gurmeet Kanwal, Harsh V Pant, Kalyan Ray, Michael R Gordon, Parvin Sawhney
11.Asian Age	Parisa Hafezi, Parul Chandra, Sridhar Kumaraswami
12.Statesman	Navy Paul
13.Navbharat Times	Ranjit Kumar
14.Jansatta	-
15.DNA	-
16. Punjab Kesri	-

Conclusions

A total of 231 news items were found in sixteen newspapers over one month period. This translates to 14.43 stories per paper in entire month, which further translates to 0.48 story per day for one newspaper. This is dismal coverage considering the fact huge outlays are made for defence sector by all the governments worldwide. This poor coverage seems to be the result of lesser number of defence journalists in India and elsewhere. Only 64 journalists were found to have written stories for sixteen national

dailies. This reveals the poor availability of defence journalists in India. The fact that only one story appeared which has delt with technical aspects of the technology, further paints a grim picture of even those who have written about defence science and technology. Serious doubts are raised whether the reporters engaged by the news paper are acculturated in any science discipline. The Hindi newspapers are in very sorry conditions as three of them were found to be only one defence journalist. India is a country where English-speaking people are in lesser number as compared to native languages. Hindi being the official language of India is most popular language. The coverage in Hindi about defence needs to be improved. The Hindi-language newspapers need to nurture talent in this area.

There is lot to be done both by newspaper and defence establishments. The defence establishments will do well to provide first hand information in Hindi so that the coverage may improve. The news papers in both languages have a long way to go to bring delight to readers looking for defence science and technology news.

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