MEDIÁLNÍ STUDIA
MEDIA STUDIES
JOURNAL FOR CRITICAL MEDIA INQUIRY

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To cite this article:
Olesk, A. (2019). Media Coverage of a Strongly Mediatized Research Project: the Case of the Estonian Satellite ESTCube-1. *Mediální studia, 13* (1), 7–27.

ISSN 2464-4846
Journal website: https://www.medialnistudia.fsv.cuni.cz/

1/2019

MEDIA COVERAGE OF A STRONGLY MEDIATIZED RESEARCH PROJECT: THE CASE OF THE ESTONIAN SATELLITE ESTCUBE-1

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ABSTRACT

The perceived value of public visibility has led research institutions and individual scientists to integrate the logic of the media into their communication practices, a process known as 'mediatization'. This paper investigates the media coverage of the Estonian satellite project ESTCube-1 (2008-2015), whose members, according to a previous study, were mediatized, i.e. skilled and proactive in media interactions. The wide and positive media coverage of the project was mostly driven by events organized by the project team and lacked outside or critical voices. The comparison of the angles presented in press releases (n=30) and in original media coverage (n=160) shows that media reproduced the framings presented to them, including the emphasis on the educational nature of the project. The purposeful application of media logic by scientists is one factor to explain the intensity and nature of the media coverage, pointing to the need for further research about the impact of mediatization processes on media content and media autonomy.

Keywords: science journalism ▪ mediatization ▪ science communication ▪ media logic ▪ space ▪ satellite

1. INTRODUCTION

The visibility of science in the media is often considered a key goal of science communication activities and is emphasized in many strategy documents both by research and research-policy institutions (e.g. Estonian Research Council, n.d.; Steering Committee for a National Science Communications Strategy, 2009; The Royal Society, 2006). The perceived value of public visibility has led research institutions and individual scientists to integrate the logic of the media into their communication practices, a process known as 'mediatization' (Hjarvard, 2013; Marcinkowski, 2014). Several studies (Peters et al., 2009; Rödder & Schäfer, 2010; Schäfer, 2011; Scheu & Olesk, 2018) have argued that the perceived need to foster media and public attention has led to changes in science on the level of individuals (e.g. use of promotional

language) or organizations (organizing press conferences, hiring of communication professionals etc).

Concurrently, a "growing intensity of mass media coverage" of science (Franzen, Weingart, & Rödder, 2012, p. 4) has been noted. Schäfer (2009) adds that science coverage in media is also characterized by more diversity in terms of actors and content, and the increasingly controversial nature of coverage. At the same time, the coverage is also driven by the rise in institutional press releases that are often published without major changes (Granado, 2011; Mathelus, Pittman, & Yablonski-Crepeau, 2012). This has been attributed to both the reduction of resources for specialized science journalism, referred to as the 'crisis of mediators' (Bucchi, 2013), and the strengthening of science PR (Göpfert, 2007).

It is evident that the changes in science institutions and the challenges science journalism is facing (Allan, 2011) will lead to rearrangements in the science-media relationship with effects on both. For science, the adoptions constituting the mediatization process can bring more public visibility to support the strategic functions of science institutions (Scheu, Volpers, Summ, & Blöbaum, 2014) but might also threaten the autonomy and values of science (Weingart, 2012). For media, the process of mediatization demonstrates its importance for other social institutions such as science (Hjarvard, 2013). At the same time, the vulnerability to PR pressure is likely to increase with the mediatization-led changes in the interaction patterns between journalists and their sources. Therefore, we should consider the mediatization of science as one of the processes that shape media coverage of science. Currently, most studies of media coverage of science look at crisis situations or topics that include contested elements (e.g. climate change or vaccines). There are less studies on the 'routine' coverage (Rödder & Schäfer, 2010) of science and in those cases, the characteristics are not easily linked with the role of the researchers in shaping the coverage.

This paper uses the example of the Estonian satellite project ESTCube-1 (2008-2015) to explore the media coverage in the case of a mediatized science-media relationship. The first Estonian satellite ESTCube-1 was built by a team of students and its scientific mission was to test a tether of the e-sail (electric solar sail), a novel space engine concept (Envall *et al.*, 2014). The project was announced in 2008, the satellite was launched in May 2013 and it concluded the mission two years later without succeeding to run the e-sail experiment due to a technical malfunction.

The case of ESTCube is well-suited for such analysis for several reasons. The project had a clear time frame, making it possible to follow all relevant media coverage. The media visibility the ESTCube achieved throughout the course of the project was substantial and the project is therefore considered by the Estonian science communication community to be one of the biggest local science communication success stories. Qualitative interviews with the research group developing and launching the satellite confirmed that they can be considered a strongly mediatized research group (Olesk, 2019). The interviews showed that the team considered journalistic media an important channel for their communication and perceived the media as

having a distinct logic to which they need to adopt to in order to get their message to the target groups. These results also revealed that the team members were personally active in managing media relations, including preparing press releases and establishing close relations with a small number of journalists who reproduced the agenda of the research group. Therefore, the researchers did not perceive adaptation to media logic (i.e. mediatization) as a threat to the autonomy of science but rather as a tool to achieve their strategic goals.

In the theoretical part, the paper builds on the concept of mediatization and presents discussions on the role of science journalism and public communication of space activities. The empirical part summarizes the characteristics of ESTCube's media coverage. The research questions guiding this study are as follows: 1) *What are the main characteristics of ESTCube-1's media coverage?;* and, 2) *In comparison, what angles and to what extent are present in the news articles and in the press releases?* By addressing the questions, the study aims to contribute to our understanding of both (science) media and mediatization, allowing to get a more nuanced picture of the relationship between science and the media and help to reconstruct the processes that shape media coverage of science. In the last section of the paper I argue that key characteristics of the coverage can be explained by the mediatized interaction pattern between scientists and journalists.

1.1 The role of science journalism

Hansen (2009) has noted that science journalism/news is often considered 'different' from other types of news, mostly due to a different relationship with their sources. Science journalists are often perceived to be closely allied with the scientific community and dependent on it (Gregory & Miller, 2000, p. 107) leading to an uncritical and deferential science coverage (Hansen, 2009; Nelkin, 1995). Research has also pointed out that science articles tend more often to use just a single source (Blöbaum, 2017). The theoretical literature agrees (e.g. Blöbaum, 2017)that science journalists should be critical observers and not in the service of science's agenda. Bucchi (2004) suggests that science writers, however, more often view their 'professional mission' in terms of popularization, in contrast to news journalists who describe their mission in terms of public need for information and expression of public concerns..

The science journalists themselves, however, do identify themselves as "journalists first and specialists second" (Hansen, 1994). According to Nelkin (1995, p. 100), "they strive to maintain the respect of their scientific sources and to satisfy the ideals of science, but they must, first and finally, meet the constraints of their own profession." This includes adhering to the common principles and practices of selecting content ('news values', see Harcup & O'Neill, 2017) and its form of presentation, in order to fulfil the role of journalism in the society and to meet to goals of the media channel. The results of journalists applying such 'media logic' (Altheide, 2013) to science coverage have often been viewed critically, pointing to issues related to negative

coverage, accuracy (Hansen, 2016), imbalance (Boykoff & Boykoff, 2004), hype or scaremongering. This is most directly in contrast to the way science is presented within the scientific community, therefore it is easy to perceive the media as "invading" and its logic undermining or threatening the logic of science (Franzen *et al.*, 2012).

Meanwhile, more and more scientists take part in science communication trainings where they are taught elements of that 'media logic' to improve their public communication skills (Besley, Dudo, & Storksdieck, 2015). The 'pull' towards media (see Marcinkowski, 2014) is also evident from the fact that research institutions increasingly add resources for communication, e.g. by hiring more communication professionals, and implement other organizational changes to improve public communication (Scheu et al., 2014). These activities are driven not as much by the wish to increase public understanding of science, but foremost to increase public and political support for science and the hope to gain advantage in competition for resources such a funding, students or political impact (Borchelt & Nielsen, 2014; Scheu & Olesk, 2018).

As a result, the scientific sources "are often acutely aware of the importance of the framing process, so will make every effort to try and ensure that their preferred definition of the issue or event is placed in a positive light," Allan notes (2009, p. 158). Given the long history of close collaboration with science journalists and a traditionally strong role of scientific sources in agenda-setting in science media (Hansen, 2009), the research institutions sometimes forget that "news media do not see it as their mission to help . . . universities . . . to build a better world." (Fjaestad, 2007, p. 130). The expectation to support the strategic goals of science institutions can be a source of further tensions between science institutions and the media. At the same time, the role of the media is recognized as crucial (also by the media themselves) in the dissemination of accurate information and in the deliberation process of important societal issues, including scientific questions such as vaccines or climate change.

The various perspectives on science journalism show that the commitments expected from them include both enhancing public understanding of science (and public engagement with science) and maintaining the values of objective journalism. Mediatization processes taking place in science can magnify the tensions created by these, sometimes contradictory, expectations. Therefore, we must ask how mediatization impacts the capabilities of media to fulfil those roles, considering that science journalism operates on the boundary of science and media, constantly negotiating the 'logics' and boundaries (Kunelius, 2014) of both fields and the relationship between journalists and their sources.

1.2 Public communication of space activities

The review of literature on the communication of space-related activities shows that the question of public support is taking the centre stage. Although public support is

often taken for granted (Entradas, Miller, & Peters, 2013) and some space exploration ventures like Mars rovers are still able to attract significant public interest and generate media attention, public opinion surveys both in the USA and in Europe reveal a more critical position towards space activities. For example, they are perceived "risky, expensive and not very useful" (Ehrenfreund, Peter, & Billings, 2010) and a lesser priority for expenditures compared to healthcare, education, childcare and defence (Finarelli & Pryke, 2007). The US studies also show that the biggest support comes from a socio-demographic group who could generally be described as 'Apollo generation' (i.e. people who were young during the first Moon landings, see Nadeau, 2013; Whitman Cobb, 2011). While the 2005 Eurobarometer survey (European Commission, 2005) shows that in Europe the interest for space and astronomy is highest in the age group 15-24 (with 28 % of the age group interested), several studies indicate that knowledge about space issues in this group tends to be poor (Miller, 1984, Entradas & Miller, 2010; Entradas et al., 2013; Jones, Yeoman, & Cockell, 2007; Joyce, Ferguson, & Weinstein, 2009; Ottavianelli & Good, 2002).

For space agencies, the possible negative implications of this decreased support and interest include less funding for future space activities and lack of scientists and engineers. While the correlation between public support and funding of space agencies is not a straightforward one (Steinberg, 2011), the drop in the relative number of science and technology students has been observed in all OECD countries. The space agencies have responded to this by extending their communication and outreach programmes. „Public engagement should be a Level One requirement for exploration," asserted space experts during a workshop on building and maintaining the constituency for long-term space exploration (Finarelli & Pryke, 2007, p. 17). Other papers, analysing communication of bioastronautics (MacLeish et al., 2005) or planetary protection program (Billings, 2006) have made similar suggestions.

The perceived need for public communication presents a clear driver for efforts to increase visibility in the media. Next to that, the quoted papers (specifically also Allner *et al.*, 2010) focus on educational programmes as the main way to heighten public support for space science initiatives. These activities aim to grow the new generation of public described by Miller (1984) as attentive: both interested and knowledgeable. One example of such of educational projects are nanosatellites (including CubeSats), mostly undertaken by universities to allow students to get hands-on experience with space projects and promote careers in space industry. Outreach and educational goals are strongly highlighted in papers discussing CubeSat mission design, like ESTCube-1 (Slavinskis *et al.*, 2015), the Danish AAU CubeSat (Alminde, Bisgaard, Vinther, Viscor, & Ostergard, 2003) or the proposed European Student Moon Orbiter (Walker & Cross, 2010). Since students are nearer to the public than big space agencies, CubeSat projects (e.g. Muñoz, Greenbaum, Campbell, Holt, & Lightsey, 2010) have also been used as a community outreach tool when students communicate their work, usually to other students, high school pupils or general audience.

The outreach of outreach, i.e. the promotion of the educational and outreach

elements of space projects fulfils a necessary role of space communication as emphasized by Finarelli and Pryke (2007, p. 16): "To build public support, . . . it is also necessary to ensure that what an enterprise does is indeed valuable to the public, is indeed relevant to them." That a similar strategic goal – using an educational approach and highlighting the societal relevance of the project to ensure public support – characterized the ESTCube-1 project, was shown in a previous study of the mediatization process of the ESTCube-1 project (Olesk, 2019). This study will explore the role of media for helping the team to achieve this strategic goal by analysing the public visibility and the messages in the media content.

1.3 Mediatization

Mediatization describes the interrelation between changes in media and communications on the one hand, and changes in culture and society on the other (Couldry and Hepp, 2013). The institutionalist tradition of mediatization research understands media as an autonomous social institution whose operating logic influences other fields or social institutions such as science, politics, religion or sports. Hjarvard (2013, 2014) sees mediatization as "institutionalization of new patterns of social interaction" and "change of institutional characteristics". Commonly, these changes are being sought in the social institutions responding to the omnipresence of media. For example, in his 2008 paper Jesper Strömbäck defined the four phases of mediatization using the example of politics: media becoming the most important source of information, media becoming an autonomous institution, (political) actors start adapting to media logic, and, finally, the actors adopting media logic to the extent that it becomes internalized to their institutional processes (Strömbäck, 2008).

A frequent critique of the mediatization approach has pointed out the difficulty of empirically verifying or evaluating the process of adopting to media logic. Most of the proposed indicators to evaluate mediatization discuss the practices of individuals and organizations, e.g. employing professional public relations staff, proactively initiating a „catastrophe discourse" (when discussing climate science) or using „promotional metaphors" (Schäfer, 2014). In case of routine coverage, formulating key messages and preparing lay explanations can be considered new interactional practices indicative of mediatization (Olesk, 2019).

The changing interaction patterns by the actors should be reflected in the media coverage, e.g. by making certain scientists or science topics more visible in the news. Therefore, a better picture of mediatization outcomes could be achieved if we complement the description of practices with the analysis of media content that is created in the context of mediatized interaction processes. The major challenge with this approach is, how to validate the presence or extent of mediatization based on media content? How to isolate the media logic inserted by the journalist from that of its sources?

It is clearly impossible to achieve this based on media content alone. Yet, media

content can become a valuable source when combined with other sources of information such as insights into the media practices of the researchers and content directly produced by them. A concurrent study (Olesk, 2019) has shown a close relationship between the ESTCube team and journalists and the mediatized characteristics in their interaction with the media. We also know that the team wrote all of their press releases themselves. This study adds the characteristics of ESTCube's media coverage as a starting point to the discussion whether and to what extent these characteristics could be attributed to the mediatized interaction patterns. A comparison of press releases with the media coverage serves the purpose of indicating how much the core agenda of the team (as reflected in press releases) was present in media coverage.

The research questions guiding this study are thus as follows: 1) *What are the main characteristics of ESTCube-1's media coverage?;* and, 2) *In comparison, what angles and how much are present in the news articles and in the press releases?*

2. METHODS

The study combines the quantitative content analysis and rhetorical analysis of press releases about ESTCube-1 (n=30) and journalistic media items from Estonian media (print and online articles from newspapers and magazines, TV and radio clips; n=160). The sample aimed to include all media material that was produced about the project during its duration: from July 2008 (when the first press release was issued announcing the project) until May 2015 (when the satellite stopped working).

For the study, I gathered press releases from the web archives of the University of Tartu and the Estonian Space office. The press releases were written by the team members and distributed by the university press office. Regarding the media items, I selected only original journalistic material, meaning that the item had to be based on an interaction between the journalist and at least one project member or a person commenting on the project. This means that rewrites of press releases and items based on other secondary material such as Facebook posts or already published media items were excluded from the sample. In addition, I added editorial content (e.g. opinion articles by journalists).

I combined various sources to gather the media items. The team kept a public media log during the first few years of the project. The Estonian libraries' article database ISE provided additional print articles and I searched the archives of all major Estonian news channels and outlets with the keywords "ESTCube" and "student satellite".

I coded the items for basic characteristics (such as place and date of publication, author, length, quoted sources). The main feature that was identified in content analysis is the element described as 'angle'. The angle is understood in this study as the presentation of a distinct facet of the project. As the ESTCube project had several facets, such as the scientific mission or its educational purpose, the highlighting of

various facets in press releases and media items illustrate the representation choices made by the sources and the journalists. However, angles are, in this case, not to be understood as types of representations or frames. Both of these imply a selection from a larger set of beliefs, meanings and rhetorical tools which then together constitute an organizing principle or structure guiding the reader's understanding of the issue, whereas angles simply describe what part of the project is highlighted, not how it is done. Several angles may co-exist in a text.

The angles were coded in a two-step process (Charmaz & Belgrave, 2012): during the initial or open coding I identified the angles, then used selective or focused coding to find up to three most salient angles per item. To be coded, the angle needed to be elaborated in the text, not just mentioned. All coding was done by myself.

In total, ten angles were identified:

- *Organizational*, describing the current state of the project, organizational arrangements, and future steps;
- *Scientific*, explaining the nature of the E-sail and its potential use in future space exploration; other research results of the satellite;
- *Engineering*, explaining the building of the satellite, technical aspects and challenges of the project;
- *Educational*, highlighting the use and impact of the project as a study method;
- *Outreach*, describing the use of the project to promote STEM-subjects;
- *Co-operation*, with other universities or companies;
- *Societal impacts of the project*, such as economic benefits, national pride, etc.;
- *Outside reaction*, focussing on awards, recognition, or critique;
- *Personal*, introducing people in the project;
- *Other related topics*, such as spin-off companies, photo contest, etc.

The quantitative data is supported by rhetorical analysis of the texts, especially looking at the quotes by scientists and editorial comments. Rhetorical analysis involves unravelling formal external characteristics of the language used by a detailed reading of fragments or larger units of text (Gunter, 2000). These characteristics allow analysing the rhetorical devices used by the researchers in interaction with the journalists (which might function as indicators for mediatization) or identify the critical or supportive position of the journalist.

I paid special attention to reflexivity during the whole research process due to my personal involvement with the case under study. At the time of the project, I worked for various Estonian media outlets as a science journalist, also covering the ESTCube-1 project. In total, I wrote seven newspaper and magazine articles that are included in the sample. Being able to closely follow the mediatization process of the research team sparked interest towards the case in the first place and guided the direction of research once I starting my PhD in 2013.

While the question of the effect of researcher's position is more commonly addressed in the case of qualitative research and quantitative content analysis is often perceived to be 'objective', it is clear that all stages of the research are influenced

by the personal background of the researcher (Gentles, Jack, Nicholas, & McKibbon, 2014; Malterud, 2001; Mruck & Mey, 2007). The common response to the concerns related to this is "a commitment to reflexivity" (Malterud, 2001, p. 484), with reflexivity understood as "the process of a continual internal dialogue and critical self-evaluation of researcher's positionality as well as active acknowledgement and explicit recognition that this position may affect the research process and outcome" (Berger, 2015, p. 220).

This paper follows the recommendation by Corbin and Strauss (2008) of using personal experiences during data analysis. These experiences can be brought into the analysis in a way that maintains primacy of the empirical data when incidents from the researcher's experience are compared at the conceptual level to incidents in the data to bring out properties and dimensions of which both incidents are examples (Gentles et al., 2014). For example, the understanding of how journalists managed the agenda-setting by the ESTCube team was developed via comparison of the content of other media items with the critical reflecting of personal experiences from interactions with the ESTCube team members and their impact on my own journalistic articles.

3. MEDIA COVERAGE OF THE ESTCUBE-1 PROJECT

3.1 Analysis of press releases

The team issued press releases during the whole project, which speaks for a conscious media strategy. 29 of the analysed press releases were published by the University of Tartu (having being prepared by the ESTCube team) and one by the Estonian Space Office. During most years of the ESTCube-1 project, 1-3 press releases were issued per year. The most active year was 2013, the year of the launch, with 17 press releases, 10 of which were issued during April and May. The satellite was launched on May 7, 2013, after being delayed for two days, and most of the press releases from May provide up-to-date information about the launch situation.

The surge of press releases during the launch period (April/May 2013) also contributes to the *organizational* angle being the most common: it was present in 43 % of all the press releases but 80% of the launch period press releases contained this angle with a clear goal of responding to media interest for ongoing events. During the remaining periods, the *organizational* angle was present in 25% of the press releases.

The press releases were used to explain the aims of the satellite project: the *educational* angle was used most often (37 % of press releases), followed by *scientific* (27 %). The *engineering* aspects were discussed in more length in 17 % of the press releases. Almost one out four press releases (23 %) discussed *outside reactions*, mostly awards and recognitions given to the project.

While educational and scientific goals were most often elaborated in the press releases, the texts strived to emphasize the multi-faceted nature of the project,

usually highlighting other aims over the scientific. For example, the following summarizing paragraph was found in several press releases:

> *"The Estonian student satellite program was initiated in 2008 by the students and lecturers of University of Tartu with the aim of popularizing science and engineering subjects, giving students practical experience and developing entrepreneurship. The scientific mission of the ESTCube-1 satellite is to test the components of the electric solar sail."*

The most visible actor was the project initiator and supervisor Mart Noorma, who featured in 24 press releases (80 %), followed by project manager Silver Lätt, who was quoted in a third of the texts. Besides them, the press releases featured five other team members and 14 outside actors, mostly representing academic, public or business sector. The role of the outside actors in the press releases is usually to express support to the project and amplify its messages related to various benefits of the project. For example, the team issued a press release when then Prime Minister Andrus Ansip mentioned ESTCube-1 in his parliament speech about science and innovation. He was quoted as saying: "Despite only having a 1-litre volume, [the satellite's] benefit can already today be measured in cubic metres." The inclusion of outside actors can be considered an adaption to media logic which appreciates a diversity of sources.

The analysis also looked at the effect of press releases on media coverage by identifying the media items that were thematically identical and published or aired within a week after the press release (excluding coverage related to events – the launch and three press conferences by the team). The results show that the press releases were able to produce up to three original items in the whole Estonian media (usually none or one). It is also notable that in the post-launch phase of the project several press releases *followed* prominent media coverage, i.e. they both reported about the project-related news or event and also provided links to various media items that had been already published about the same news or event. Personal experience and previous interviews (Olesk, 2019) indicate that the team at this stage no longer considered press releases as an efficient tool for initiating media visibility but preferred using personal contacts with journalists or organizing large press conferences.

3.2 Analysis of media coverage

The media coverage sample includes 160 original journalistic items (43 radio clips, 43 TV clips and 74 print and online articles). All main Estonian media channels/outlets covered ESTCube, showing a trend that the bigger audience the channel/outlet has, the more it covered the project.

Figure 1 (below) shows the distribution of media coverage and press releases over the course of the project. Similar to the distribution of the press releases, more than half of the coverage (59 %) concentrated on 2013, the year of the launch. The first

three years of the project had 3-5 original media items per year and the final year of the mission (2015) saw another peak with 20 items. On other years, the number of media items was between 10 and 12.

Most coverage was related to events (see Figure 1): 23 items were connected with the launch, 11 items with the first major press conference in January 2013 when the satellite was shown to the public before the launch, and another 11 items accompanied the February 2015 press conference about the end of mission. The third press conference, celebrating one year in space, inspired seven media items. One more coverage spike was in August 2013 when the satellite had several close encounters with space junk. No press release was issued about this incident.

The timeline on Figure 1 demonstrates that the ESTCube project was constantly visible in the media from beginning of 2011 until the end of the project (having at least one original media item per 3 months). The only gap in press releases and coverage was between May 2014 and the end of 2014. This was the time when the team tried to conduct the scientific experiment. The fact that the experiment failed was revealed only in the final press conference in February 2015, indicating that the team deliberately kept a low profile during the experiment and after learning of its failure.

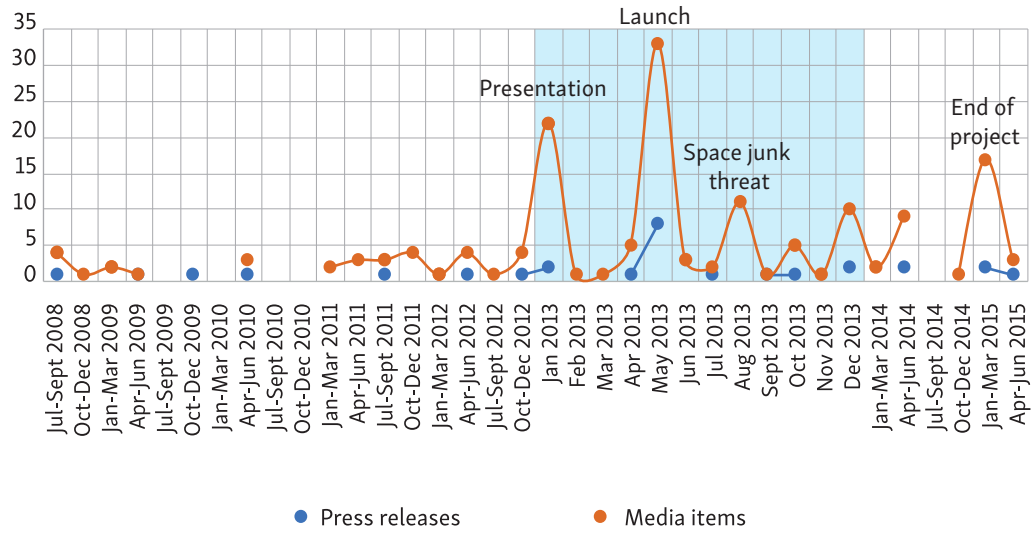

FIGURE 1. Timeline of ESTCube press releases and media items (units on time-axis represent three-month sections, except for the launch year – 2013, on background – which is presented month by month)

The two individuals most prominent in the press releases (Mart Noorma and Silver Lätt) were also most visible in media, being present in 76 % and 12.5 % of the items, respectively. The third position was occupied by an outside actor – Ene Ergma, a well-known astrophysicist and, at the time, the speaker of the parliament. She featured in 14 media items while being present in none of the press releases (although media

coverage indicates that she was present is some of the events for the press). She presented herself in the media coverage as a strong supporter of the project.

Most media items were produced by various channels of Estonia's Public Broadcasting – 27 by its main TV channel and 18 by its main radio channel. Estonia's biggest daily, *Postimees*, had 24 articles and the main commercial talk-radio channel, *Kuku*, 20 items. Altogether these four major channels produced more than half of the total coverage. Concentration of coverage to certain channels is also obvious in comparison between similar type of channels: in TV, the main commercial channels produced 8 and 9 items respectively (compared to 27 in the public broadcaster). The 24 articles on *Postimees* stand out in comparison with 13 in the main tabloid newspaper, 6 articles in the second-biggest daily and none in the main business daily. The pattern indicates concentration of the coverage to the channels with most visibility and weight in the society, matching the media visibility goals of the team.

The most prolific author was Villu Päärt (10 articles), a writer for the University of Tartu-owned science news website *Novaator*. The science editor of *Postimees* (i.e. myself) produced 7 items, as did the science editor of the radio channel of the public broadcaster ERR. Another four authors had 5 items each. This shows that the ESTCube team established relationships with some journalists who reported about them throughout the project, indicating an interactional pattern characteristic of mediatization.

Figure 2 (below) shows the prevalence of angles in the press releases and media coverage. Compared to the press releases, the *scientific* and *engineering* angles were more pronounced in the media items. Not surprisingly, the dominant angle (present in 79 % of media items) was *organizational* – updating what is happening with the satellite (see Figure 2). 39 % and 27 % of the items, respectively, dedicated time and space to explaining the science results and expectations, and the technical aspects of the satellite.

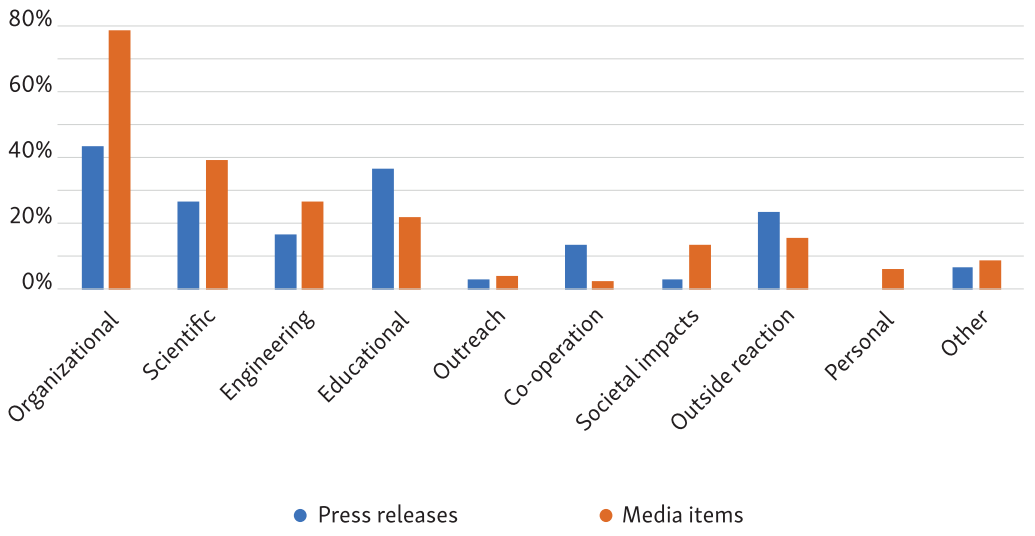

FIGURE 2. Percentage of the press releases and media items with identified angles.

The *educational* angle received elaboration in 22 % of the media items – less than in press releases but still being quite visible. The rhetorical analysis reveals that this result was impacted by agenda-setting by the sources: they frequently highlighted this aspect of the project in the interviews but were not always allowed by the interviewing journalist to elaborate it further.

A similar pattern can be observed with the angle *impact to the society*. Especially in the TV and radio interviews, the team members often found ways in which to introduce the wider societal aims of the project whereas the original question by the journalist might have concerned something else. This is a characteristic example from the TV breakfast show:

> *Host: "What is the mission of the satellite?"*
>
> *Mart Noorma: "To support Estonia's economy and support Estonia's reputation as a country capable of developing high-tech. This is the most important mission. But in scientific sense [the mission is] to test components of the electric solar sail."*

Sometimes the journalist would then guide the conversation back to the scientific and engineering aspects, avoiding elaboration. But especially the journalists who reported about the project several times adopted the frame and also started highlighting the *educational* and *societal impact* angles in their items. For example, these aspects featured heavily in the media coverage when Mart Noorma was declared Person of the Year 2013 by *Postimees* newspaper.

The quotes by the team members show that they understood how media expects them to communicate science: it is evident from the way they simplify, use examples and comparisons to explain science and technology, and add intriguing facts[1]. While using grand statements when discussing the wide societal impact of the project (such as contribution to the growth of the economy and increasing national happiness), they talked about the potential results of the specific science experiment much more cautiously and, hence, similar to the style used in academic articles and can be thus considered an element representing science logic.

The team managed expectations of the public by emphasizing the complexities of and risks related to space engineering and science which creates uncertainties about whether the satellite will complete all planned tasks (or even start operating at all). The team also placed their work in a bigger scientific context by describing all the incremental progress that is needed to realize the electric solar sail.

The presence of only a very small number of critical voices and outside actors among all the coverage shows that the ESTCube team managed to own the topic in the media and actively guided the framing of the project. In 2008, just after the first announcement, a space engineer wrote a critical opinion piece, doubting the

1 The press conference dedicated to the end of the mission is a good example: https://www.uttv.ee/naita?id=21515

meaningfulness of the endeavour. But otherwise, no-one openly criticized the project or questioned the claims made by the team. Among the sources quoted in the items there is no-one who could be considered an independent expert. Rather, all non-project sources are somehow affiliated with the project and express their support to the satellite team.

The announcement that the satellite could not complete its main scientific mission, testing of the component for the electric solar sail, was presented at the final press conference. The role of the failure of the scientific experiment to the overall success of the mission was downplayed in the statements on the team. A similar framing had been present also before: a recurring quote throughout the later stages of the project was that 90 % of the whole mission had already been successfully accomplished by completing the building of the satellite.

The team achieved a successful reframing of the criteria for the project's success. Most journalists covering the final event followed the proposed framing of overall success, putting their focus on emphasizing other project outcomes or introducing upcoming missions and not highlighting the failure of the scientific mission. This contrasts the previous coverage where the e-sail experiment had featured prominently and journalists often built their story around it. One of the most frequent questions to the team after the launch was: 'When will you conduct the experiment?'

Some subtle critic to the proposed framing of the project's success came only from two experienced journalists. One of them referred to earlier statements by the project members that tied the success of the mission to the success of the scientific experiment and wrote: "It would be very unfair to consider ESTCube-1 in any way unsuccessful yet it would be fair to call it partially, not completely successful." The other journalist was the only one to critically address a central claim the team used to describe the success of the project – that the project was scientifically relevant, producing a high number of academic articles. He pointed out that most of these articles had been published in journals with a very low impact factor. However, neither of these critiques was addressed by the team or discussed any further in the media.

4. DISCUSSION

ESTCube-1 represents a science story that received a wide and positive coverage in the media. The journalists acted in a typical science popularization framework. They made efforts to explain the science and technology behind the project, strived to inspire the young generation and make STEM-subjects look more attractive. Their selection of sources can be argued to show (and incite further) trust towards scientists. All in all, the coverage contributed to the overall positive image of science and technology, and is thus similar to how science community expects media to build public support for their activities.

At the same time, we also see that media allow the sources to control the agenda. We know from previous research that the team aimed to develop close ties with

a number of journalists in media channels with high visibility (Olesk, 2019). This paper shows that some journalists in such channels did indeed report extensively on the project, while the timing of articles or news clips indicate that they sometimes received exclusive information. These journalists preserved and even amplified the framing presented by the team (e.g. about the multi-faceted nature of the project) and sought no independent experts or critical voices as sources.

It is likely that the nature of ESTCube contributed substantially to media's stance. It had 'sex appeal' and "managed to strike many of the right chords in the 'basics of a successful journalistic subject' all at the same time" (Carra, 2007) to use the words once used to describe the story of Dolly, the first cloned mammal. ESTCube was extraordinary – the very first Estonian satellite, testing a potentially revolutionary technology for interplanetary travel, a potential source for national pride. However, the media skills of the team members should not be underestimated in explaining the amount and nature of media coverage. The ESTCube team communicated with the public throughout the project, issuing a number of press releases and turning each project milestone into a media event. Despite the fact that the team's scientific work and progress was introduced at these events, none of these events were mainly being driven by scientific reasons but rather organizational or other milestones: finishing the building of the satellite, launch, one year in space, or closing of the project. The interaction patterns established by the team – the press releases, press conferences, close relationship with a selected number of journalists and good communication skills – provided the project constant visibility and a mechanism through which to influence the media content. In the end, we see that the ESTCube-related sources and frames prevail in media content.

The comparison of angles in press releases and media content shows that angles from the press releases that got amplified in the press can be matched to the theory of news values (Harcup & O'Neill, 2017). The story of the satellite (*scientific* and *engineering* angles) gained media attention in the first place because it was *surprising* (the first ever Estonian satellite, a novel space travel technology), concerned a *powerful* organization (university), was *relevant* (involved Estonians) and promised *good news* (a successful experiment). Later coverage was also driven by *following up* the progress of the satellite, explaining the prominence of the *organizational* angle. During the project, the team used additional news values to support constant visibility such as *exclusivity* (offering a story to one journalist only), *drama* (satellite threatened by space junk) and *magnitude* (the project will benefit the whole country).

The *educational*, *co-operation* and *outside reaction* angles, at the same time, represent the aspects that are important for the research team and their institution but can be argued to lack a strong news value that would make journalists perceive them as relevant for their audience. Therefore, they are underrepresented in media coverage when compared with the press releases.

However, the *educational* angle is still well represented in media coverage, being salient in a fifth of media items. Their *educational* agenda was persistently brought

forward by the ESTCube team in all their communication and we also see it being adopted by journalists.

How are these results relevant for the study of mediatization? They point to an important avenue of further research for a deeper understanding of mediatization and its effects – how journalists respond to the use of mediatized practices of the sources. A previous study of ESTCube team members (Olesk, 2019) showed that for researchers, reflection on media interactions was an important learning method. It shaped their understanding of media logic and honed their skills of getting their agenda published or broadcast.

The extent to which the sources are successful in this quest is determined by the response of journalists. In case of ESTCube, we can hypothesize that the supportive rather than critical behaviour of the journalists became a factor that created additional opportunities for the mediatized practices of the research team to shape media agenda and content. If the mediatization of another social institution is strong (i.e. its representatives purposefully apply media logic to achieve media visibility and fulfil their strategic goals) we may ask whether it increases their abilities to control media content at the expense of media's autonomy or its journalistic norms and values.

It may be so if we understand mediatization necessarily as a zero-sum game of the competition of logics. Marcinkowski argues (2014) that adopting media logic does not necessarily mean that the values or principles of the other field needs to be negotiated. Access to media may actually mean that institutions are better equipped to achieve certain strategic aims (in case of science, for example, attracting bright students). Media, in that scheme, may provide and amplify that access to the extent that it shares or supports the aims of the institution without losing the potential or possibility of autonomous 'watchdog' journalism when it becomes necessary. The case of ESTCube illustrates nicely the first part of this argument. More cases are needed, however, to confirm whether the latter part holds true as well.

While this paper may give hints of the feedback effects of the mediatization process on media itself, an in-depth analysis of the interaction patterns between journalists and their sources would be needed to provide evidence of such effects. Considering the role that media autonomy plays in enabling media to fulfil several of their crucial societal functions, the question about the presence and impact of mediatization effects on media is increasingly relevant.

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