



The Communication Function of Universities: Is There a Place for Science Communication?

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Abstract This article offers a view on the emerging practice of managing external relations of the modern university, and the role of science communication in this. With a representative sample of research universities in four countries, we seek to broaden our understanding of the *science communication (SC) function* and its niche within the modern university. We distinguish science communication from corporate communication functions and examine how they distribute across organisational levels. We find that communication functions can be represented along a spectrum of (de)centralisation: public relations and marketing activities are more likely carried out at the central level (central offices), and public affairs and SC activities are more likely carried out at decentral levels (e.g. in specific offices and/or research institutes, departments). This study shows that little attention is paid to science communication at central structures, suggesting that it is not a practice that aligns easily with university corporate communication, yet SC might find its niche increasingly in decentral locations of activity.

Keywords Science communication · University communication · Communication functions · PR · Public dialogue

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Introduction

Public communication of science has become a key obligation of universities. It is no longer a secondary activity carried out sporadically by a minority of intrinsically motivated researchers (Bauer and Jensen 2011). But it has become part of the rhetoric and governance of universities (Engwall 2020), with policies and increasing resources allocated to it (e.g. Entradas et al. 2020a; Mejlgard et al. 2012). Yet, we lack a broad understanding of how this affects the practice of science communication and where it sits in the university.

One way to examine the *science communication function (SC)* (Entradas 2022) in a complex organisation such as a university, is to recognise it as one among other communication functions by which universities address their intended audiences, and that might occur at different organisational levels; Entradas and Bauer (2022) propose a simple framework to study institutional communication, which distinguishes the meso-level (activity at research institutes), the central level (activity at central communication offices) and the individual level of scientists. For instance, education marketing has centralised and become key for attracting students and media attention. Yet, in a climate of increasing competition for students, staff and funding, where the university becomes a goal-oriented ‘organisational actor’ (Krücken 2020), science communication becomes a new challenge. We are thus asking how science communication practice relates to the rise of the ‘attention-seeking’ culture of the university sector (Weingart 2022) and what ‘communication’ are universities doing centrally and decentrally.

To answer these questions, we are faced with the challenge of understanding the practices of communication at different levels, and of distinguishing science communication from corporate functions such as Public Relations (hereafter PR), public affairs (hereafter PA) or marketing (hereafter MA), which have also been tasked with communicating about research (Nelkin 1995; Shipman 2018; Weingart and Joubert 2019) even in cases warranted by science communication models (Weingart and Pansegrau 1999). Theoretically corporate communication comprises different practices in organisations (Bentele 2008). Yet, distinctions are not easily sustained given the lack of clear definitions and confusions of key terms across various literatures. There is also a lack of understanding of how these functions are operationalised in practice, i.e. what everyday activities define them. Not all university communication is about research and not all communication about research relies on science communication. These are fuzzy distinctions that we need to clarify first when examining the role of science communication within the new university practice.

The goal of this paper is thus twofold. First, we try to disentangle the communication functions of modern universities, conceptually and empirically. Second, we examine how communication functions distribute across the organisation testing the ‘decentralisation hypothesis’ (Entradas 2022; Entradas and Bauer 2022), i.e. the expectation that science communication will flourish as a decentral practice, while PR, PA, and MA activities (for science also) are likely to be centralised.

In what follows, we consider a range of literatures, including organisational communication, marketing, public relations, and science communication that

provide insights into communication activities at universities, and we seek conceptual clarification with the strong meaning of ‘dialogue’ to distinguish these functions. We try to recover key conceptual issues that bear on how we assess activities and associate them with professional functions in the context of universities. We then formulate our hypotheses and report methods and findings. Finally, we discuss implications for the practice of science communication.

The University Communication Functions and the New Practice

The 1980s bring an important shift in the way universities approach communication. The New Public Management (NPM) reforms of the public sector (e.g. De Boer et al. 2007) have led to an ‘academic capitalism’ where universities have become less reliant on state funding for the education of the new elite generation and more pressured to attract private money and a wider range of ‘costumers’ (Slaughter and Rhoades 2004; Williams 2016). Under increasing competition, national and international prospective students (Hemsley-Brown and Oplatka 2006), research funders, the government decision-makers and stakeholders increasingly became important targets (Cunningham et al. 2009). It is then no surprise that universities have sought to recalibrate their communications to this new regime of governance (Clark 1998). The literature is dispersed but converges to describe three main functions, which one might jokingly refer to as the ‘holy trinity’ of corporate communication: (1) *marketing* knowledge products for students (Brown 2011), (2) *public affairs* to reach science and education policy makers (Kollman 1998); and (3) *public relations* for managing the corporate image and reputation in a trust relationship with stakeholders and the wider public (Grunig 2013). New structures serving these functions include PR offices, marketing suits, and public affairs teams where ‘university management professionals’ with rising strength guard the interest of the institution (e.g. Krücken and Meier 2006).

While these functions have often been separated in different departments and practitioners have stressed different communication skills and competences (Spicer 1991), some noted overlap of PR and marketing, or PR and PA activities within the same offices (Falkheimer and Heide 2014; Moss et al. 2017). For our purposes, it is then crucial to clarify distinctions in the context of communicating about research where these functions are invoked (Carver 2014; Shipman 2018). Yet, empirical research that demarcates such concepts is at best limited. In the next section, we review literature on university communications, and how it has developed. We start with the three classical functions of marketing (MA), public relations (PR) and public affairs function (PA), and then come to the Science Communication (SC) function.

University Corporate Communication Functions

The *marketing function* (MA) in higher education institutions has evolved from the business sector (Kotler and Fox 1995) and has professionalised for branding

purposes, reputation management, and selling university products (Gioia et al. 2000; Ivy 2001). It was primarily developed for the recruitment of students, stimulated by increasing competition for overseas students and based on the assumption of students as customers who financially support the university (Molesworth et al. 2010; Thornton 2014). With a focus on visual messaging and targeted markets, marketing activities in the university context have often included advertising of university products in media channels (TV, internet, radio), producing print visuals such as brochures and publications, developing strategic websites and attractive multimedia (to encourage students to apply), and organising events that involve direct interaction with prospective students such as student fairs and campus visits (Schüller and Rašticová 2011; Kotler et al. 1990). Much of the interest in research on marketing in higher education has then been on the marketisation of HE and consumer behaviour (Klassen 2002; Arnett et al. 2003) and less on marketing strategies. Nevertheless, this has not hindered criticisms that the practices and models from business are incompatible with the university organisations' structures as the values of advertising contradict the values of science and education (Hemsley-Brown and Oplatka 2006).

The *public relations function (PR)* has been adopted by universities with gusto for the 'relationship management' of trust and symbiotic relationships with stakeholders and publics (Ledingham and Stephen 2000), to look after 'good' reputation and image (Doorley and Garcia 2015; Hutton et al. 2001). The extensive literature on PR has proposed definitions of what it means (e.g. Jefkins 1983; Grunig 1992) and some authors have even suggested characteristics of an excellent public relations function where two-way symmetrical PR enhances public participation, and gives voice and empowers publics in organizational decision-making (Grunig 2013). This theoretical approach has however been strongly criticised as a theory that does not serve the interest of public and society but only the interest of the management and the organisations whose communication approaches are 'organisation-centred' and disconnected from the meaning of 'dialogue' (L'Etang and Pieczka 2012; Leitch and Neilson 2004; Theunissen and Wan Noordin 2012). In practice, PR activities have been described as having a strong focus on relations with the media, other stakeholders and communities, alumni relations, fundraising or managing crisis communication when issues arise that can harm institutions' reputation (e.g. Hall and Baker 2003; Luo 2009). PR has been also the adopted function by universities to communicate about research (e.g. Nelkin 1995; Weingart 2022; Marcinkowski and Kohring 2018), often through media interviews and press releases (e.g. Vogler and Shauffer 2020; Autzen 2018) and online channels (Fanhric et al. 2020), to attract visibility to the institution (Marcinkowski et al. 2014; Entradas et al. 2020a), an observation that is not new and brings considerations about institutions' motivations to communicate, which matter to define SC in the university environment.

The *public affairs function (PA)* has often been described in the university context as communication with specific stakeholders with responsibilities in the areas of government and policy formation. PA is thus a specific and focussed PR activity. The goal is to influence public policy, government policy making, civil society decision makers and parliamentarians on science, education policies and funding streams for research (Murray 1976). Relations between scientific and policy institutions are

not new to universities—there have always been academics informing and advising policy makers on science or university policy—and have had a particular role in communicating risk for the environment (Healy and Ascher 1995; Jones et al. 1999), and in some cases in politicising issues with controversies (Weingart 1999). Activities involve lobbying policy circles (Harris and Fleisher 2005) to guarantee the institutions' interests (e.g. Murray 1976), to remain part of the conversation or even be ahead of the game, maintaining direct relations with one-to-one meetings with politicians, parliamentarians and civil society decision makers, campaigning for donations involving national associations, presidents/chancellors and governmental relations professionals (Kollman 1998), and (more recently) supporting researchers to engage with the policy making world. PA in the context of communication in higher education has been less explored in the literature (Mcgrath et al. 2010).

Science Communication (SC) Function

Science Communication while not at all a new practice of universities has in more recent years become revalued (Laredo 2007). Perhaps the most important shift is the clear recognition of the role of 'society in science'. The traditional public service idea with its conventional one-way community outreach (Roper and Hirth 2005) is replaced by a discourse to engage the broad society in 'dialogue' and in a 'social conversation' about science (Bucchi and Trench 2021). This revalues old and new communication formats, which allow for debate and participation in the research processes through co-creation models (Owen et al. 2021). That performs a disinterested, knowledge-based communication, in the interest of society, not constrained by the self-interests of a corporate logic. We refer to this as the *science communication function*, i.e. the communication efforts of a university to communicate and engage society—various publics—in research for a civic purpose and the common good (Entradas 2022; Entradas and Bauer 2022). From our perspective, these are broad and can involve one-way and two-way communication models, and many communication activities ranging from the traditional public lectures to public participation events, which importantly allow for societal dialogue.

This societal dialogue in SC is distinguished from the 'organisation-centred' vision (also from 'dialogical' PR), and the current understanding of PR, PA and MA as management functions of universities, defined as the strategic and purposeful deployment of communication to fulfil the university mission, to attain targeted outcomes measured on success and efficiency (Hallahan et al. 2007). By contrast, our view of the science communication (SC) function resonates with communication ideals that enhance the common good, seek common understanding, aims at public enlightenment and empowerment, and call for restoring some fundamental features of human communication, often thwarted by adverse circumstances, but rooted in the potential for 'dialogue': interaction needs to be on equal footing without a hierarchy, fear or favour, and it involves all parties to make mutual learning possible (Freire 1967; Habermas 1984). Linell (2019) defines this an 'interaction with' participants, turn-taking, building on each other's points of view, and arriving at joint attention and joined-up meaning (Linell 2019). This is sharply demarcated

from strategic purpose as in PR, PA and MA, defined on criteria set by the speaker, ego-centrally interested. These different motivations denote a clear dichotomy of *communicative purposes*: a self-interest orientation (as in PR, PA and MA) and a focus on common good (as in SC). We thus align SC in contrast to MA, PR and PR with what Habermas (1984 and 1987) demarcates as communicative action oriented on seeking common understanding on the one hand, and strategic actions oriented towards success on the other.

With scarce literature on the SC function (Entradas 2022), arguments have focussed on the significant use in universities of PR for science. However, we still lack a clear understanding of what science communication is and is not in the university setting. As not all communication of research in universities invokes science communication, identifying some demarcation criteria appears crucial to distinguish these functions empirically.

SC Distinguished from PR, MA, PA on Key Criteria

Although there have been preoccupations from scholars highlighting this distinction between SC and PR (Carver 2014; Shipman 2018; Marcinkowski and Kohring 2018; Weingart and Joubert 2019; Autzen and Weitkamp 2019) no solid frameworks have been presented suitable for empirical research, a fact that might have its roots in the twined language and unclear definitions of what these functions might entail. For example, Weingart and Joubert (2019) call for distinguishing science communication functions based on motives. They propose a dichotomy between science communication activities ‘type 1’ designed to educate/inform and engage the public in dialogue, and activities ‘type 2’ that comprise activities designed to promote and persuade (image building, political attention, media relations)—that yet seems too broad for empirical research. Marcinkowski and Kohring (2018) based on ‘rationales’ and ‘audiences’, contrast the *push communication* that academic institutions have adopted (often carried out by university press officers), directed at targeted audiences often the media for public attention and used as a PR strategy, with the *pull communication*, aimed at a broader public (whoever is interested) for the interest of the public who then selects what is of interest to them. Entradas and Bauer (2022) in their mapping of SC at the meso-level of research institutes and departments include various activities, resources, audiences and motivations to define the SC function, bringing attention to the importance of investigating different organisational levels as SC might find its niche in decentralised structures. Yet, their focus was neither on the central activities nor on distinguishing different communication functions, as we do here.

Considering these conceptual distinctions and literature insights, we highlight some key criteria that, in our view, allow us to distinguish SC from corporate communications of a university. These are:

- the main target audience (despite overlap, we define the ideal target audiences for each function),

- the expected outcomes (a focus being strategic positioning versus enhancing public debate); and
- the purpose of communication: a distinction between strategic-interest purposes for communication as in PR, PA and MA versus an open-ended dialogical purpose as in SC. One might even argue that SC aims at symbolic hegemony in society thus going beyond representing particular interests with a focus on the common good.

As functions might overlap in some features (an audience is not exclusive to a function), to define activities, it is necessary to combine these criteria to deepen the distinction between SC and other functions. A meeting where scientists communicate with decision makers about a new development of a technology, drug, or vaccine (might be considered a SC activity) is distinguished from a meeting with parliamentarians to discuss and influence some policy strategy (which might be considered a PA activity), in its purposes and expected outcomes despite addressing similar audiences. It is this distinction that we are attempting to make.

Table 1 summarises and contrasts the four functions along these three criteria of target, outcome and purpose. A fourth criterion—the activities that characterize these functions—is an empirical question. It is an empirical problem how to map day-to-day activities into communication functions, how these key distinctions are realised in practice; we have tried to do so in our research. But activities and functions are notoriously ambiguous because there is no clear one-to-one mapping, only a tendency of any practice to operate and recognise a dominant map. Moreover, the above characteristics of a dialogue are somewhat abstract and difficult to identify in practice, they are intuitively recognised, endorsed and unerringly handled in the practice of communication.

Table 1 Contrasting four communication functions along these criteria: target, expected outcome and purpose, and the *key* distinction of activities.

	SC	PR	Marketing	Public affairs
Target	Society at large (general publics)	Media and journalists (Industry and Businesses...)	Market Students Target groups	Government Parli- ament Civic society
Outcome (expected)	Debates, towards a common under- standing Societal dialogue	Image Reputation Identity	Product focus (Branding...)	Policy influence (Avoiding regula- tory costs)
Purpose (motives)	Public interest Empowerment Enlightenment Common good Hegemonic reason	Interest of the institution Partial rationality Media attention	Interest of the institu- tion Partial rationality Students' attention	Interest of the institu- tion Partial rationality Political attention
Activities	Empirical?	Empirical?	Empirical?	Empirical?

The Decentralisation Hypothesis

It is in this context that we investigate also the ‘decentralisation hypothesis’ (Entradas and Bauer 2022). We anticipate science communication ambiguously positioned in university priorities. Central communications offices’ activities focus on PR, PA, and MA functions for purposes of image control and reputation management, leaving limited space for SC. On the other hand, the niche space for SC could be in decentral structures (e.g. research institutes, departments and centres) which are closer to the research action, hosting grants that often require dissemination and which ask for public engagement plans. Thus, the research centres and department level might be the future niches for science communication (Entradas and Bauer 2022). And, we expect this tendency to be internationally convergent because the countries compared in this study went through similar NPM reforms of higher education for purposes of efficiency and market success (Ruão 2008; Paradeise et al. 2009; de Boer and Jongbloed 2012; Krüger et al. 2018). We thus formulate two hypotheses:

H1 As the communication function is becoming professionally more competent at all levels, we expect centralisation of PR, PA and MA functions, and decentralisation of the science communication (SC) function.

H2 The separation towards decentralised science communication (SC) and centralised corporate communication (MA, PR, PA), as described in H1, is consistent across the four countries under study.

Methods

Data Collection and Sample Design

The data are from the international project OPEN (Organizational Public Engagement with Science and Technology (2019–2023) funded by the Portuguese funding agency, Fundação para a Ciência e Tecnologia (FCT). The project aimed at investigating university communication and the role of science communication in it, by analysing the activities of central communication offices in four countries: Germany, Italy, Portugal, and the United Kingdom.

The national surveys were distributed online to central communication offices (one per office) between May 2020 and March 2021 and the data was centrally collected in Lisbon using the Qualtrics platform. The survey follows the logic of an institutional study, each respondent representing one institution (see O’Muircheartaigh 2022) on how to sample institutions). Data collection went through two phases to increase response rates: an initial call-up and follow-up phone calls to encourage further participation. All correspondence with respondents was conducted in local languages. The questionnaire was translated into local languages and back translated into English by the national teams for quality control.

Questionnaires enquired about communication practices, motives, and communication dynamics between levels with a focus on practices at central communication offices.

Sample Design. The sampling frame of communication offices was constructed from lists of universities and based on the assumption that one central communication office exists per university responsible for the institutional communication; this is different from the Press offices of universities (which often exist as separated units), and can refer to central communication offices, communications department of a university, communications office, under different names.

To build the list of universities, each national team listed the universities in the country from official sources and websites. These are whole population studies, i.e. include all universities in these countries, in Portugal, Italy and Germany. In the UK, the list corresponded to the REF universities (2014) (N=154), which includes the most active research universities that are subject to Government audit and receive government funding. For each university, we compiled general information (e.g., public, private, size, students, funding). Information was also collected on the contact person in each central communications office of the university, who was responsible for communications and who could speak about the university's communication strategy and the activities of the central communication office. We contacted the central communication office at each university—one per university and distributed one questionnaire, as our goal was to understand the communications dynamics of the entire office and not *only* the views and practices of those practitioners as previous studies have done.

We contacted N=719 universities in the four countries, one office per university, and received N=319 responses, which accounts for an overall response rate of 44%. This is a high response rate for email surveys which often approximate 25–30% (Yun and Trumbo 2000), but more so for surveys of organisations, whose response rate is often lower than 20% (O'Muircheartaigh 2022). Table 2 summarises the number of universities contacted, the number of universities that responded, and the response rates, by country. In terms of size of universities, these tended to be medium to large with an average number of students M=11536 (SD=16735) and Median=5038, and an average number of staff M=827 (SD=1276), Median=350.

Respondents. Respondents—one per university—were in most cases communication professionals working at the central communications offices; most identified themselves as communications staff (62%), management staff (21%), administrative staff (2%), academic staff (6%), or others (5%; in some cases, this corresponded to the rectorate/top management staff). On average, the respondents had been working in their current positions for 9 years (M=9.2, SD=7.9, Median=6).

Measures

Operationalisation of Communication Activities

Given the lack of conceptualisation of university communication activities, we make an attempt to offer some clarifications. We depart from a list of twenty-four items

Table 2 Number of universities contacted, number of universities that responded, and response rates by country

Country	Universities contacted		Universities responded		Response rate (%)
	(N)	(%)	(N)	(%)	
Germany	368	51	124	39	34
Italy	97	13	92	29	95
Portugal	100	14	63	20	63
United Kingdom	154	21	40	13	26
Total	719	100	319	100	44

which, while not exhaustive, aims to cover a diversity of activities. Table 3 shows the list of items including the percentage (%) of universities that reported engaging in them. The fact that most universities engage in all the presented activities might be a good indication of the appropriateness of the indicators. This does not mean, however, that other items could not have been included or might not be included in future studies; a detailed study of day-to-day communication activities is long overdue.

The list is informed by the relevant literatures and, importantly, from exploratory interviews and continuous informal conversations with a few communication managers personally known to the researchers in the different countries. These colleagues provided insights into the organisation and activities conducted at central offices of their universities, and feedback on the list of items that the team was developing. For each item (activity), we asked respondents whether the activity was conducted at (5 options): (1) “At the central office”, (2) “In another office within the university (e.g., research institutes/units/departments)”, (3) “Both within the central comms and others”, (4) “The university does not do it”, and (5) a “Don’t know” option. The activities were recoded following a degree of centralisation as: (1) decentral, (2) both, and (3) central level; options (4) and (5) were not considered for our analyses as they do not provide information regarding (de)centrality of an activity, and they represented only a small percentage in a few activities. This question is a significant methodological advance over previous research of the meso level of research institutes (Entradas et al. 2020a) which mapped decentralised activities but not decentralisation, i.e., whether activities at the meso-level are decentralised or are carried out in collaboration with other levels.

Categorisation of Activities into Communication Functions

To categorise the 24 activities into 4 functions (PR, PR, MA, and SC) we used a deductive approach based on expert classification. We acknowledge that activities are more or less typical for a specific function, and they might be classified differently by experts or possibly practitioners. Team members and a few science communication researchers from their research groups (total of N=8), independently classified each activity. Experts were specifically asked to categorize activities based on the criteria listed in Table 1. This classification was then validated by reassessing the original classification by experts outside of the project. Three ambiguous activities lacking sufficient

Table 3 Categorisation of communication activities into functions (N=319).

Communication functions	Activities	% of universities conducting the activity (%)	Central activity (only)* (% univ) (%)	
Public relations	Writing press releases	99	77	
	Liaising with journalists	98	74	
	Dealing with crisis communications/emergencies	96	70	
	Organizing media training for researchers	61	50	
	Creating campaigns	93	63	
	Producing university corporate publications (print and visual)	97	55	
	Cultivating an internal network of researchers	85	34	
	Facilitating university relations with stakeholders (co-creation, knowledge transfer to business and industry)	93	7.4	
	Marketing	Managing the university brand (logo, brand)	98	75
		Advertising university events	98	59
Organizing student fairs (welcome, recruitment)		96	31	
Relating to and engaging Alumni		93	15	
Feeding research to and facilitating opportunities for academics to engage with policymakers		92	15	
Public affairs	Networking with groups representing universities	94	15	
	Monitoring education and research policies	94	14	
	Liaising with lobbyists (e.g. consultancies)	75	13	
	Producing research content for the university website	95	29	
Science communication	Supporting and encouraging academics to engage with civil society	91	21	
	Organising university public events about research	97	22	
	Facilitating community engagement in research (e.g. Science shops)	71	13	
	Assisting academics in grant writing of outreach and engagement plans	92	6	

agreement were not considered for the analysis. These were: 'fundraising', 'maintaining and monitoring a social media presence', and 'managing the university website'. These activities not specifying goals might serve different functions. Eight items were categorised as predominantly PR activities; four items as MA activities; four items as PA activities; and five items as SC-activities (Table 3).

(De)centralisation indices. We built composite indicators of the decentralisation of functions using the mean of the constituent items within each function. For instance, the degree of (de)centralization of the PR function is given by the mean 'decentralisation' score of all items classified as PR-related. Indices ranged from (1) decentralised to (3) centralised activity. Reliability tests show that the indices are sufficiently reliable: PR (Cronbach=0.62), PA (0.60), MA (0.65) and SC (0.61).

Analysis

We use descriptive statistics, the Chi-squared test, ANOVA, and Bonferroni tests for between-group comparisons. The differences were considered statistically significant for p values <0.05 .

Results

We briefly describe the communications staff at the central communications offices (N=319) in terms of size and time dedicated to science communication tasks. Central communication offices employ in average eight professionals for communications tasks (M = 7.7; SD = 8.9; Median=5). This number has increased in 56% of the universities over the past 5 years. Yet less than 3 persons dedicate time to science communication tasks (M=2.7 persons, SD=3.3, Median=2). In terms of background, most of the staff working at central offices has a communications background, either undergraduate or postgraduate degree (M=3.2, SD=28), fewer have training in science communication (M=2.1, SD=28), still the majority has been trained on the job (M=4.9, SD=28.8).

Communication Activities Across University Organisational Levels

The data show that universities engage in a broad range of activities, and this activity has increased for 92% of the surveyed universities over the past five years (in 65% of these it increased substantially); this is regardless of the country indicating a consistent trend of increasing activity over time.

The data also clearly show a pattern of (de)centralisation of these activities with some activities being more likely to occur centrally and others at a decentralised level (see Fig. 1). Among highly centralised activities are for example, 'writing press releases' (centralised in 77% of the surveyed universities), 'liaising with journalists' (reported at central offices in 74% of the universities), 'maintaining a social media presence' (75%), and 'dealing with crisis communication' (70%). It is also at

the central level that some marketing activities are more likely to be carried out such as ‘managing the university brand’ (75%), and ‘managing the university website’ (59%). Fewer universities have these activities at decentral levels (around a third).

Activities that emerged at the other extreme, more decentralized were for example, ‘assisting academics in grant writings’ (decentralised in around 77% of the universities), ‘Relating to and engaging alumni (45% decentralised)’, ‘monitoring education and research policies (43%)’, ‘engaging with policymakers (40%)’, ‘liaising with lobbyists (42%)’, ‘facilitating community engagement in research’ (47%), ‘fundraising’ (66%), ‘facilitating relations with stakeholders’ (48%). Also, to note is the large overlap with some of these activities being conducted—albeit rarely—at the central offices as well. For instance, ‘producing research content for the website’ is conducted at both levels in 47% of the universities, in only 24% of the universities are they fully decentralised, ‘organizing public events about research’ (56% conduct them at both levels, vs. 22% that conduct them fully decentral); ‘supporting academics to engage with civil society’ (54%) (vs. 25% decentral), ‘facilitating community engagement in research’ (fully decentralized in 47% of the universities and 40% both). This might indicate shared responsibilities for certain SC activities, which seem to be more likely media communication and support for researchers in their public communication work. This mix is not found among PR media-related activities which clearly defines a focus of central offices on media communication. These data point to a variety of activities carried out at various levels, with some visible differences across functions.

We then used our classification of activities into four functions as shown in Table 3 to compare how the four functions distributed across levels using the composite indicators for degree of centralisation (1 is decentralised, 3 is centralised). Table 4, which compares the means of centralisation of functions, shows that PR and MA are tendentially more centralised, while SC and PA tendentially occur outside the central communication offices, supporting in great part H1.

Comparison of Communication Functions Across Countries

Finally, we examine whether the above-mentioned tendencies are found across countries, using one-way ANOVA tests (see Supplementary Tab S1). Figure 2 shows the degree of (de)centralization of functions across the four surveyed countries and the variation in the data. The general tendencies of (de)centralization remain constant across countries for the four functions—PR and Marketing functions being more centralised, PA and SC function more decentralised, supporting our H2. Despite this, we find some differences between some groups, albeit small (as seen by low F values of ANOVA tests). We explored where the differences between countries lie with Bonferroni tests. We find a statistically significant difference in the level of centralisation of the marketing function between Portugal and Germany ($p < 0.001$, 95% CI 0.089–0.473) and Portugal and the United Kingdom ($p = 0.001$, 95% CI 0.149–0.652): Marketing activities are more centralised in Portuguese universities compared to British and German universities corroborating studies showing

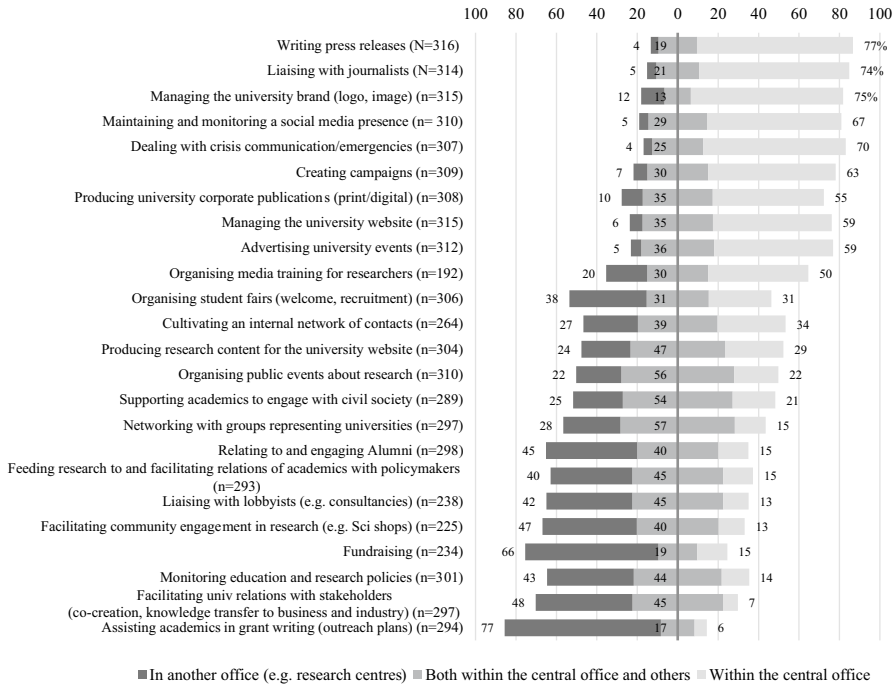


Fig. 1 Public communication activities distributed across organisational levels: (1) within the central (light grey), (2) both, (3) other than the central (dark grey). Percentages are shown for each activity and each level. The number of responses is shown for each item

strong marketing approaches in Portuguese universities (Ruão 2008). The PA function is different between universities in Germany compared to Italy with the activity being tendentially more centralised in German universities ($p < 0.001$, 95% CI 0.084–0.457); in the other countries it is more dispersed.

The PR function is stabilized in all countries as a centralised activity; the posteriori tests show no significant differences, as seen by the effect size; so the ANOVA significant results for this function seem to be only due to differences within groups. Finally, the SC function is more centralised in universities in Portugal compared to universities in Germany and in the UK, but interestingly it is also in Portugal that the universities are more decentralised in their overall structures (seen in the Q1s).

Table 4 Indices of centralisation by function ($n = 319$)

Function	Mean	SD	Median
Public relations	2.41	0.35	2.43
Marketing	2.21	0.48	2.25
Science communication	1.80	0.46	1.80
Public affairs	1.75	0.52	1.75

The ANOVA shows differences within groups, suggesting variations between universities in the same country (Tab S1). This is shown in Fig. 2 and is most visible for the PA and MA functions: the MA function is more dispersed across levels in German, Italian and UK universities and less in Portuguese universities; the PA function shows a larger dispersion among Portuguese and Italian universities and less in German and UK universities perhaps due to it not being established as a (separate) function (yet); this is the case in Portuguese universities; and the SC function shows larger variation in Portuguese universities, which might be only an indication that many SC activities are conducted at different levels, while also suggesting a stronger commitment in Portuguese universities to SC function. This might in part be a result of the government ‘science culture’ policy that asks institutions to communicate their research to the public (Entradas et al. 2020b).

As seen in the data dispersion, most of the cases are within the box plot, and the whiskers (25% each side), which could compare to a nearly normal distribution, in most cases represented in the charts. The exception is for PA and MA in German universities where the data are less symmetrical, and less tightly grouped, suggesting larger variation within the country. While this could suggest different tendencies in different countries, this dispersion might be only showing variation between universities. For example, in Germany we covered universities of applied sciences (HAW) (often quite small) and full universities, often larger, with a focus on education and research which might lead to a more marketing-oriented strategy. And, in Portugal we covered faculties within the two largest universities, which have their own centralised communication.

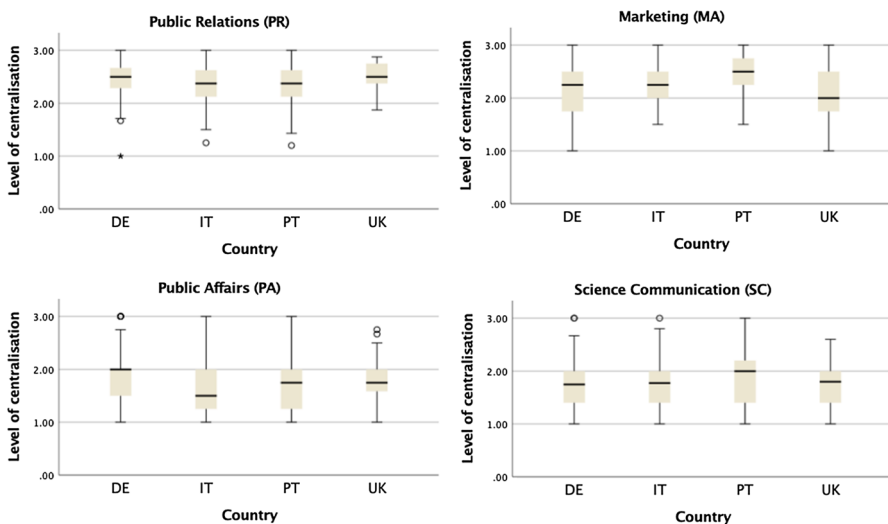


Fig. 2 Level of centralisation of communication functions across countries as given by the means. Box plots show the distribution of activities of PR, SC, PA, and MA, showing the third quartile (Q3) and first quartile (Q1) range of the data and data outliers (dots). The line is the median of the data. In these charts, 50% of the cases are within the box, 25% between the box and the minimum value. Number of cases: n (DE) = 124; n (IT) = 92; n (PT) = 34; n (UK) = 40

Discussion

This study seeks to advance our understanding of the ambiguous role of science communication in the modern, increasingly commercialised university. We hypothesised that meso-level structures play an important role, and we formalise this in our (de)centralisation hypothesis. To test this hypothesis, we compare the distribution of communication activities across organisational levels of universities. This requires us to differentiate communication functions conceptually and empirically. By asking central communication offices about their practices, with a list of 24 common communication activities, we were able to distinguish the SC function from PR, PA, and MA. These functions can be characterised by the criteria target, outcomes and the purpose of communication, and empirically through distinct sets of activities. Conceptually they cut across a fundamental dichotomy, with SC on one side, PR, PA, and MA on the other.

The university communication function is empirically fuzzy; a range of activities played out across organisational levels and mixed practices in offices with different names. Yet, activities distribute within a distinct pattern that is found across the four countries studied: PR (mostly media related) and MA activities are tendentially located at central communication offices; these include activities such as writing press releases, liaising with journalists, managing the university brand, creating campaigns, or producing corporate publications. SC activities are more likely to be found in offices outside of the central location; these are varied, one and two-way communication, including producing research content for website, organising public lectures, community engagement, or co-creation citizen science activities. Budging this patent trend, in many universities some SC activities are conducted also at the central level; however, these are more likely to be traditional, one-way dissemination; most SC activities that allow for two-way communication and potential dialogue have their location decentrally, in research centres and departments (see also Entradas 2022; Entradas and Bauer 2022). In the majority of universities activities such as facilitating relations with stakeholders, co-creating and facilitating community engagement are mainly played out outside of the central offices. This distribution might suggest that university structures at different levels have similar responsibilities, or it might indicate that different levels share responsibilities related to communicating science (or a mix). Some universities also have centralised SC, taking control of this function in the central office.

There are also PR and MA activities carried out outside of the central offices such as for example alumni relations and fundraising, which is rather an indication that these activities have their dedicated (mostly central) offices; indeed, many universities have separate offices staffed by professionals for cultivating relationships with ex-students and graduates, and potential philanthropic donors. The same can be said about PA. PA activities were reported as being more likely to be conducted outside of the central communications office, possibly in a separate office for the purpose, centralised at the level of management where contact with decision-makers in higher education policy is maintained primarily by the Presidencies and Rectorates or Vice-Provost offices.

Based on these empirical observations, one could think of communication activities spreading along a spectrum of (de)centralisation: at one extreme, centralised strategic-oriented PR and MA activities, at the other extreme, decentralised civic-oriented SC and PA-oriented activities. These observations are consistent with our decentralisation hypothesis: science communication activities have their centre of gravity increasingly in decentral, meso-level institutes, while PR activities are performed in more central location. But it is important to note that boundaries between these functions are fuzzy and there is a tendency for practical overlap.

This brings implications for the system of modern university communication and SC in particular. Firstly, the focus of central offices on PR media relations, also for science (PR science), and MA, points to a preoccupation with corporate image of the university. As Oscar Wilde observed more than a hundred years ago: there is *'only one thing in the world worse than being talked about, and that is not being talked about'*, thus seems undisputable that a 'good image' is no bad thing, and institutional communication should aim at building this. However, it is also under this corporate focus that some traditional SC activities come into play. Central offices engage frequently, for example, in writing press releases (in 77% of the universities) or organising public events about research (centralised in 72% of the universities). This is not a new observation. Previous studies in German universities had pointed to the instrumentalisation of scientists presented to the media for institutional promotion and reputation (Marcinkowski et al. 2014); however, as discussions on what is SC and PR emerge, we empirically show using robust data that goes beyond studies on university media relations, that the 'attention seeking' is the focus of universities at central offices. Within this, one can see university central offices functioning as sources of symbolic activities, using PR, MA and even SC activities to enhance visibility, media attention, and national and international reputation. At this level science communication is simply serving the interests of the institutions.

Universities might decide to focus on what is attractive for journalists and reputational goals rather than on what is true, truthful, and right (Habermas 1984). Such a focus leaves little or no space to encourage 'dialogue and debate in the public sphere' from the central level. If the SC strategy is only driven by ambitions of corporate visibility, impact, and 'news values', the operational requirements of adapting to these values could counteract the efforts that seek to endorse the 'evidential values' of responsible science and research, thus becoming yet another toll for institutional visibility. There will be conflicts of interests within the universities. The focus on the institutional image might conflict with the values and motivations of communication professionals in the SC function, creating difficulties, if not impossible conditions for participatory SC to stabilise in the institution. Such conflicts of interest might even put the venerable traditions of academic freedom at risk (see, for example, Weingart and Pansegrau (1999) and Weingart (1998), for discussions of the perverse role of media prominence in relation to scientific reputation).

Dialogical communication serving the interest and needs of society, disinterested, open-ended, that allows for interaction in 'epistemic communio' as invoked by Freire, 'dialogicality' as describe by Linell, or 'communicative action' as defined by Habermas, may find its new niche at the decentral structures of the university. We can see these in activities such as facilitating relations with stakeholders (e.g.

co-creating) and facilitating community engagement, which are mainly carried out-side of the central offices in the large majority of the universities.

Secondly, we highlighted that there need to be conditions in place for the SC function to develop; a conducive public sphere needs to be supported and maintained by universities. This means that ideals need to resonate with the overall university strategic priorities in order to garner support and resources. Otherwise, there is a growing risk that these practices, mainly located at the meso level, become detached and marginalised in the broader vision of the university. An institutional approach to public communication of science that is 'organisation-centred' as it has been described for other functions such as PR (e.g. Leitch and Neilson 2004), might hamper the conditions that are needed for the open-ended discussion about science embodied by the SC function at the decentral level.

On the other hand, the effects of dialogue are open-ended and unpredictable, and therefore risky, and their value for institutions might not be immediately evident. Dialogue involves resources, knowledge, and above all the acknowledgement and cultivation of common values. Many 'deliberative dialogues' are done for the sake of projects and with no real connection to policy making and thus are unlikely to reach the goals of the promising rhetoric (Entradas 2014). Others might bring 'risks' for institutions (L'Etang and Pieczka 2012). Dialogue is not in a general sense superior but a way of engaging people in discussions that matter to them and a way in which they can contribute to the long-term development of society. The questions then become when is dialogue needed and appropriate, are universities aware of it, do they know how to do it, do they take responsibility for it, and can they do it in the wider circumstances?

We are not pitching one communication function against the other. And indeed, different activities in communication serve different functions, both potentially and in real practice, and as such it is important to recognise the interdependence of these practices. Strategic action is functionally needed but not sustainable without a real communicative precondition. Purposeful messaging and image making still requires the deeper common ground to be in place; without it there is the risk of no longer finding resonance in society. Communication without strategic aims seem inefficient, strategic communication without common ground is ineffective; the latter is dependent, or parasitic, on the former. It is therefore not a good idea to reduce all communication to a single systemic function be it reputation management for profit and creating economic added-value, truth seeking, or enabling public debate. All these functions and others might have to be juggled by the same institution in different sections. For example, PR activities with a focus on building an image and reputation, harmonising institutional marketing, crisis communication, or maintaining relationships with stakeholders and publics more broadly, are all capacities that modern universities need to develop. But many of the activities which we have identified as 'potentially dialogical' will have difficulty to be realised in many circumstances. The constraints are not equally distributed in the modern university, in terms of resources, competences, and pragmatic circumstances. However, constraints should not cloud our senses of what is possible and needed for better science communication.

Finally, these findings are common across universities in the four countries studied, with visibly similar patterns of (de)centralisation across countries suggesting

that the overall approach is similar: the central focus is on PR and marketing, PA and SC increasingly find their niche outside the central offices.

Limitations

The main limitation of our study concerns the listed communication activities, as others could possibly have been added. Yet, they represent a respectable sample of a universe of communication activities, useful for our purposes of examining where within the university these activities take place. Also, functions were defined based on expert categorisation. Future research might refine these indicators and explore in more detail the day-to-day activities of university communication offices and the views of communication professionals on the distinctions presented here. Also, the fact that respondents reported (also) on the decentral activities, future research could explore the same questions with practitioners at the meso level. However, in our view, this is unlikely to invalidate our study for the decentral activities; the question itself, how it is formulated and what it enquires about is not a 'challenging' one for these practitioners who are part of the central management of communication and thus likely to be aware of the university dynamics activities asked. In fact, we would think of these actors to have a reliable understanding about whether those activities are centralised or decentralised in their institutions; also given the size of the universities (mainly small to medium). Nevertheless, this aspect should be kept in mind when looking at the results.

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Declarations

Conflict of interest The authors have no conflict of interest to declare that are relevant to the content of this article.

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