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The Culture of Research: A Systematic Scoping Review

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ABSTRACT

Introduction: Research culture is the core of many processes in science. It is a broad concept presumably entailing practices, traditions, norms, etc. that prevail among researchers and other stakeholders in the field. Its definition, architecture, and taxonomy are essential in generating and pursuing scientific policies at universities and countries. As there is a lack of comprehensive reviews on research culture, the present publication aspires to fill the existing gap in the knowledge. This review aims to define research culture and build an architecture of research culture based on the relevant literature indexed in the Scopus database.

Method: The problem, concept, and context (PCC) framework was applied to establish an effective search strategy and word the research questions corresponding to the aim. Based on Arksey and O'Malley's methodology (2005) and PRISMA checklist (2020) for systematic reviews, the authors sorted out 56 relevant publications for systematic scoping review. In addition, a bibliometric analysis was applied to examine the field.

Results: Using a bibliometric analysis, the 56 publications were distributed by year, country, most prolific authors, sources, research fields, affiliation, and type of publication. With the help of VOSviewer, the authors singled out four thematic clusters (research culture; medical and biomedical research, methodology and research ethics, and clinical studies and human experiments). After synthesizing the data extracted from the documents under review, research culture was defined; components of research culture were singled out and summed up; and a framework of research culture was made up. The authors analysed the review findings in contrast with other research, offering their own comprehensive definition of research culture, its taxonomy, and an architecture of research culture.

Conclusion: The current review adds to the understanding of research culture, its gist, component classification. The limitation related to the period of review (2019-2024) may be overcome by further reviews of relevant publications from a historic perspective that would broaden perceptions of the origin of modern research culture and its negative aspects.

KEYWORDS

research culture, culture of research, publication policy, university, journal, scholarly publications, integrity, open science.

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INTRODUCTION

The culture of research has been in focus for the recent years as it is undergoing substantial change and influences all processes in science and all stakeholders (individual researchers, research teams and laboratories, universities, journals, associations of researchers, ministries, and other related institutions). Open science, e-science, a wide spread of scientometrics and other quantitative tools of assessment, a worldwide "publish or perish" research policy (Jones, 1999; Bond, 2023), and global change of the academic profession (Lenzen, 2015) might have added to the significance of the theme (Munafò et al., 2020).

Though the earliest publications on research culture indexed in the Scopus database date back to the 1980s (Polk,1989). The studies that focused solely on research culture have been rare. The concept was approached from various perspectives: new research culture in design

(Agnew, 1993); developing a research culture in specific environments, including nursing (Farrington, 1996; Thompson, 2003), in disciplines (Finnegar & Gamson, 1996), in music therapy (Kenny, 1998), medicine (Meyer, 2000), in an academic environment (Nicholls & Cargill, 2001), further education (Cunningham & Doncaster, 2002), in library instruction (Cain, 2002), in teacher education (Reid et al., 2010). Many publications cover country-related issues of research culture: research culture in the UK (Holligan, 2011), in Russia (Konnov, 2012), in the Arab Middle East (Armour, 2014), in India (Patel, 2010), in Spain (Ion & Castro Ceocero, 2017), in the USA (O'Connor & Bristow, 2018). Other aspects also attracted attention of the researchers: relationship between ethics and research culture (Gallagher, 2015), research culture and reproducibility (Munafò et al., 2020), building or fostering research culture (Rubdy, 2005; Jenks, 2008; Parse, 2007).

The field seems to be developing. In the Scopus database, the total number of publications on research culture (by their titles, keywords, and abstracts) reached 1,481 documents as of February 2024. The authors failed to find any complex research on the concept, but for few articles with a wide scope (Joynson & Leyser, 2015). The concept is still not included in modern thesauri on social sciences that do not list "research culture"[1] so far. Thus, the definition of research culture also requires refining.

Any culture is a broad multidisciplinary term. Probably, it is one of the widest concepts ever. R. Williams (1985) outlined it as "one of the two or three most complicated words in the English language". Most definitions of culture at large tend to include knowledge, traditions, norms, values, beliefs, habits, etc., acquired and accumulated by a society or a member of society (Taylor, 2016; Abraham, 2006). Research culture is more specific and related to research though it may be approached as a culture at large, from a sociocultural perspective.

One of the most prevailing definitions of research culture was worded on the site of The Royal Society of Science (2018), describing research culture as the one that "encompasses the behaviours, values, expectations, attitudes, and norms of our research communities"[2]. But definitions and structure of research culture are rather disputable as there are numerous viewpoints of the gist of research culture and its most effective trajectory of development. Many publications offered their definitions of research culture from other perspectives (Hill, 1999), including organisational (Johnson & Louw, 2014), context-oriented (Hanover Research, 2014), agent, and mixed (Frias-Navarro et al., 2020). Though, all definitions have much in common. In most, one can see sets of notions and groups of agents, and descriptions of contexts where research is produced, or features relating to research processes and outcomes.

The vagueness of definition is subject to unclear architecture of the research culture concept. In literature, the components of research culture are ambiguous, with various, often contradicting sets depending on the authors' research aims and scope.

There is a definite gap in the knowledge that may impede further studies on the transformations in cultures of research taking shape throughout the world, mainly publications on open research culture (Ma et al., 2024; Sanabria-Z et al., 2024). Tucker & Tilt (2019) maintain that the notion of research culture is inclined to diverse interpretations. They underline "potentially serious ramifications" such interpretations cause for researchers and science. A more profound analysis may align research culture with high-quality research, research performance (Joynson, & Leyser, 2015), motivation for science and other significant aspects of science. There are many approaches to research culture that affect all major aspects of science from governance and funding to research process and performance (Johnson & Louw, 2014).

The search for scoping and systematic reviews in the research field brought a few reviews, though dwelling upon distinct aspects of research culture: open science culture of research (Kahn & Koralova, 2022); institutional citizenship, research cultures, and the role of the State in fostering them (John, 2011); and changing research cultures in U.S. industry (Varna, 2000). None was focused on the culture of research on its own.

The current review aims to build a generic architecture of research culture based on the relevant literature, and this systematic scoping review was conducted to answer the following research questions based on the PCC framework described below in the Method Section:

RQ1. What is the culture of research?

RQ2. What components does research culture entail?

METHOD

Transparency and Protocol

Before commencing the current investigation, we meticulously developed a research protocol. Beyond the enumerated deviations delineated subsequently, the authors

[1] Sage Terminology. Sage Social Science Thesaurus. URL:https://concepts.sagepub.com/vocabularies/social-science/en/ (accessed February 28, 2024); UK Data Service. Hasset Thesaurus. URL: https://hasset.ukdataservice.ac.uk/hasset/en/index/K

[2] The Royal Society. Research Culture. URK: https://royalsociety.org/news-resources/projects/research-culture/ (accessed February 28, 2024)

hereby certify that the present manuscript constitutes a faithful, precise, and transparent depiction of the research conducted; that all significant facets of the study are reported comprehensively; and that any departures from the original study design have been duly elucidated. The reporting of this systematic scoping review was conducted in accordance with the PRISMA guidelines to ensure methodological rigor.

Search Strategies

Search Sources

This review systematically interrogated the Scopus database to identify pertinent scholarly works.The two keywords "culture of research" and "research culture" were used to find the documents in the Scopus database. The literature search was executed over a period extending from February 20 to February 22, 2024. Concurrently, the bibliographies of the incorporated studies were meticulously examined to unearth supplementary studies of relevance.

Search Eligibility Criteria

The population/problem, concept, and context (PCC) were defined to establish an effective search strategy (see Table 1), with a rationale for each criterion. The population/problem component was not identified as the review did not focus on a specific condition or cohort.

Study Selection

Both reviewers independently assessed the titles and abstracts of the identified studies, marking them preliminarily for inclusion or exclusion. This initial flagging was subsequently cross-verified by both reviewers. Studies that met the criteria during the title and abstract review were earmarked for comprehensive full-text analysis, which constituted the next phase of study selection. Discrepancies between reviewers were meticulously examined and resolved through collaborative dialogue, culminating in a consensus.

Table 1

Eligibility Criteria

Criterion	Inclusion	Exclusion	Rationale
Problem	N/A	N/A	This component is irrelevant to the review
Concept	Definitions of research culture (=culture of research); components of research culture	Other concepts relating to research culture	The aim of the review is to build a generic architecture of research culture, defining research culture, identifying and classifying its components
Context	Environment of research culture (universities, research centres, journals); research policy at universities and research centres	Research culture at other educational levels and in business	Focus of the review is on research culture at universities and research centres, and factors fostering or negatively affecting the phenomenon
Language	English	Other languages	English serves as a lingua franca of international science
Time period	2019-2024	Before 2019	The review aims to show today's picture of research culture, the way it is understood and defined at present
Types of sources	Any types, full text	Unavailable sources, no access to full texts	The purpose is to gather all the sources possible
Geographical location	Any location	None	Getting international perspective
Database	Scopus	Other than Scopus	The Scopus database has an impressive international perspective both by countries and high-profile sources relating to the academe and research at large and research culture, in particular
Areas of Research	Social Science	Other Research Areas	The culture of research is thoroughly studied within social sciences

Data Extraction

To collect data systematically, our team designed a tailored data extraction form (Appendix 1). We conducted a preliminary test of this form using a subset of ten relevant studies to ensure accuracy. The form captured key details such as the corresponding author's name and country, publication year, study methodology, and journal title. Additionally, we noted whether each paper included a definition of 'research culture,' marking it as either present or absent. This encompassed both explicit definitions (e.g., «Research culture is characterized by…») and implied references. Furthermore, the data extraction form included separate columns to record information regarding the structural components and characteristics of the research culture, providing a multi-faceted perspective on each document's content.

For articles meeting our inclusion criteria, we carefully extracted sections describing the attributes and components of research culture. Initially, one reviewer performed this task, which was then validated by a second reviewer. Any discrepancies were resolved through consensus discussions. If a particular trait or characteristic of research culture appeared in multiple sections, we extracted a representative quotation for clarity.

Data Analysis and Synthesis

Our data analysis combined quantitative methods (e.g., calculating frequencies and proportions) with qualitative techniques (e.g., thematic content analysis). Initially, we compiled a list of potential features and elements of research culture through collaborative efforts. This list served as a framework for categorizing statements extracted from the articles. New categories were created as needed, and duplicate statements within articles were recorded only once. The focus was on thematic consistency rather than verbatim transcription.

In the subsequent analysis phase, redundant or synonymous categories were merged into overarching themes. Two reviewers systematically examined these themes to synthesize findings. An iterative coding process was employed, with each characteristic and component coded independently and refined through discussion. Consensus meetings were held regularly to finalize thematic categories and their definitions. Reviewers revisited the data to ensure alignment with agreed-upon themes. Finally, a comparative analysis of thematic assignments was conducted, resolving any discrepancies through consensus. Two distinct thematic outcomes emerged: categories representing various aspects of research culture and descriptors qualifying these aspects, often with positive or negative connotations.

RESULTS

Search and Study Selection Results

The following inclusion criteria were used as the Scopus filters: period 2019-2024; publication types – article, review, book chapter, and editorial; Social sciences (subject area); and English (language). The searches brought 39 and 246 documents respectively. All publications brought by the search for "culture of research" were duplicates of the publications included in the search results for "research culture". Visual scanning of the titles was first performed to eliminate the 105 publications that are not eligible for the review. The sample was reduced to 141 documents. Then the second scanning was applied to the abstracts of the 141 documents, decreasing the total to 104 publications. Thus, the research situated outside the environment described as "context" of the review was also eliminated. The full texts of 65 publications (out of 104 left after the abstract screening) were received both via open access and on request from their authors in the Research Gate Network. After extracting the data from the 65 full texts, another 14 publications were eliminated as we failed to find any data to the point. The final sample included 51 documents.

An additional search was conducted through the reference lists of the literature to encompass a broader range of publications pertinent to the objectives of this review. At this stage, the search strategy focused specifically on identifying publications in which authors explicitly and implicitly defined the culture of research or detailed its components.The selected publications added five documents to the review, including two articles, one review, and two editorials. All papers were published within the period stated in the inclusion criteria. All five publications are Social Sciences research. The data were retrieved from those publications following the same eligibility criteria. The supplemented publications brought the total of the full-text documents to 56.

The PRISMA flow-chart (Figure 1) depicts the identification and screening procedure.

A Bibliometric Analysis

The distribution of the ultimate 56 publications under review by year was the following: 2019 - 9; 2020 – 6; 2021 – 13; 2022 – 13; 2023 – 12; 2024 – 3 (incomplete data for the year). They included 48 articles, 1 book chapters, 5 editorials, and 2 reviews.

The most prolific authors were Borders, L.D.A; Dewey, J.; Dix, G.; Schuchardt, A.; Tijdink, J.; and Valkenburg, G. with two publications each. The other 136 researchers claimed to author one publication each, including co-authored papers.

Figure 1

Selection of Publications for the Review

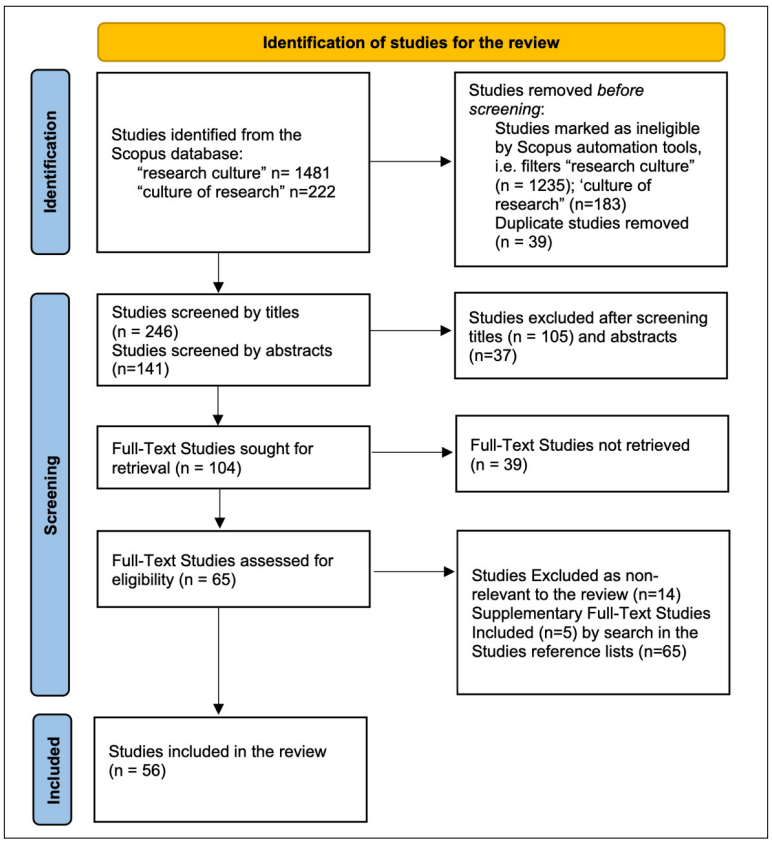
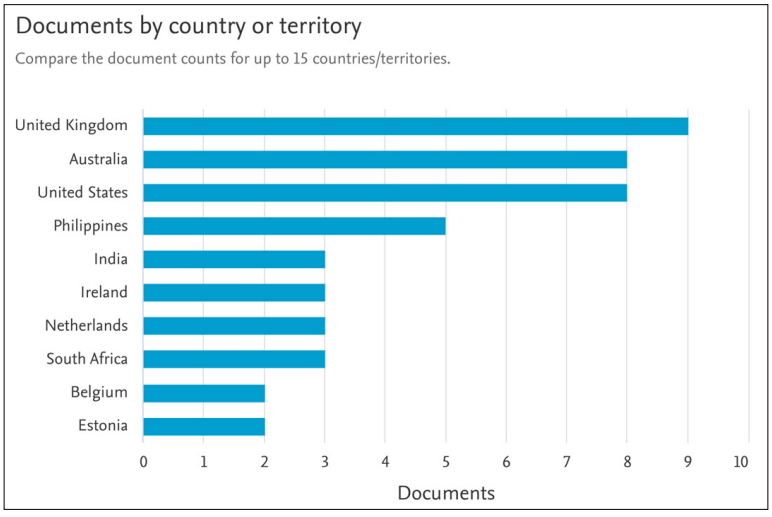


Figure 2

Scopus-Indexed Documents on Research Culture by Country or Territory



Note. Scopus Database as of February 28, 2024.

The geographic breakdown of the reviewed research covered the UK with 9 publications; Australia with 8 publications; the USA with 8 publications; the Philippines with 5 publications; India, Ireland, Netherlands, and South Africa with 3 documents each. The other 23 countries accounted for one to two publications each (Figure 2).

As for the affiliations, the top universities by number of publications (with two papers each) entailed Amsterdam UMC - Vrije Universiteit Amsterdam, Vrije Universiteit Amsterdam, RMIT University, Norges Teknisk-Naturvitenskapelige Universitet, the University of North Carolina at Greensboro, Cebu Normal University, Universiteit Leiden, University

of Oxford, University of Minnesota Twin Cities, Tartu Ülikool, and the Superior University, Lahore.

Though we filtered the search results by research areas (Social Sciences), some of the publications entered more than one area. Thus, all 56 papers were marked as Social Sciences research with 9 publications simultaneously attributed to Medicine; 8 papers to Business, Management, Accounting and Nursing each; 4 articles to Arts & Humanities and Biochemistry, Genetics and Molecular Biology each; and 3 to Health Professions and Psychology each.

The 56 publications of the review were distributed by type as follows: 48 articles, one book chapter, 5 editorials, and 2 reviews. The journals that had published the reviewed papers included *BMC Medical Ethics* (4 publications), *Accountability in Research* (2 publications), *CBE Life Sciences Education* (2 publications), *Counselor Education and Supervision* (2 publications), *Insights: the UKSG Journal* (2 publications), *International Journal of Evaluation and Research in Education* (2 publications), *Minerva* (2 publications), *Science and Engineering Ethics* (2 publications), and the other 36 journals with one publication each.

The authors' most often used keywords included "research culture" (27 publications), human (16 papers), humans (14 papers), article (9 publications), adult (7 publications), higher education (6 papers), questionnaire (6 publications), survey and questionnaires (6 publications), female (5 papers), human experiment (5 publications), male (5 papers), research personnel (5 papers). The other key words were listed by the authors four or fewer times.

Thematic Clusters

The VOSviewer software's analysis of the metadata from the 56 selected publications mapped out a structured landscape of thematic clusters, each color-coded to denote distinct realms of focus within research culture studies. The yellow cluster encompasses the educational and research contexts, delving into how various environments and pedagogical methodologies influence research productivity and academic pursuits. This cluster represents a critical examination of the factors that shape research outcomes within higher education settings.

The blue cluster centers around medical and biomedical research, indicating a rigorous engagement with research methodologies and the implementation of robust standards critical for medical inquiry. This includes the exploration of specialized techniques and ethical considerations unique to medical research, underscoring the need for methodological excellence.

The green cluster addresses the discourse on research ethics, examining the principles that guide researchers and students in maintaining academic integrity. This cluster is concerned with the ethical underpinnings of research practices and the measures taken to prevent misconduct, highlighting the importance of ethical norms in scholarly activities.

In the red cluster, the focus shifts to practical applications in medical schools, clinical studies, and human experiments. This area is indicative of the intersection where theoretical frameworks meet practical application, emphasizing the necessity of applying research findings to clinical settings and the intricacies involved in human studies.

Overall, these clusters illustrate the interconnectedness of various aspects of research culture, with each contributing to a comprehensive understanding of what fosters effective and ethical research practices. Notably, studies within the medical field traditionally pay close attention to the standards of research culture and its characteristics, promoting maximum transparency and objectivity in research endeavors. These considerations are essential for ensuring that research not only advances knowledge but also adheres to the highest ethical and methodological standards.

Defining "Research Culture"

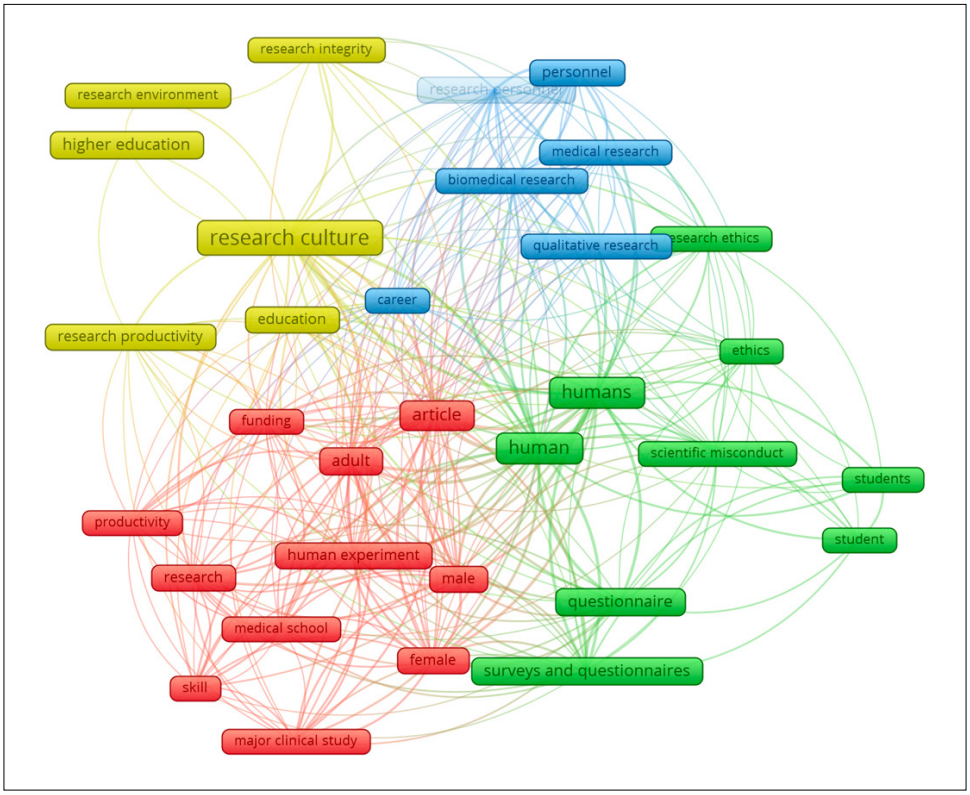
The analysis of 56 publications revealed that definitions of research culture were presented in 19 documents. These definitions were either formulated by the authors of the articles under review or were cited from other sources (Table 2). The two most popular definitions belong to The Royal Society of Science and Evans (2007) cited in 5 and 6 publications respectively. Both definitions have much in common, stating that values, behaviours (both definitions), and assumptions, beliefs, rituals (Evans, 2007) and expectations, attitudes, and norms (The Royal Society of Science) of the research communities (The Royal Society of Science) embody research culture.

Other definitions have much in common with the frontrunners (Nadeem, 2011; Canti et al, 2021; Puplampu, 2021; Kuhn, 1977; Dundar & Lewis, 1998; Deem & Brehony, 2000). Some researchers link research culture to organisational culture (Callard, 2023; Hill, 1999; Alison et al., 2017; Ryan & Hurley, 2007; Puplampu, 2021; Hopwood, 2002), or even an institutional framework (Evans, 2007).

We also found other approaches to definitions of research culture. Some complex definitions reflect an intricate nature of research culture. Adefuye et al. (2021) included actions, environment, and daily routine within an institution in research culture as perceived by the study's participants. Frias-Navarro et al. (2020) focused their definition on a set of actions carried out by all the stakeholders within scientific research and communication. From an agency position, university research culture is seen as an individual's capacity to conduct research (Lodhi, 2012). There are very broad definitions, including policies and practices affecting all aspects related to research (Dill, 1986). Research culture is solely linked to research performance (Dundar & Lewis, 1998) or knowl-

Figure 3

Visualizing the Thematic Clusters of the Reviewed Literature



edge production (Knorr Cetina, 1999). Some studies define research culture to prioritise research integrity (UKRI, 2022 as cited in Callard, 2023).

The 4 out of the 56 publications included in the review aimed to analyse perceptions of researchers regarding research culture. The perceived research culture as seen by the participants of those studies was described diversely (Table 3). The participants dwelt upon the following issues related to research culture: part of daily doing; an enabling and supportive environment; collective actions; unwritten guidelines; an atmosphere of continuous research; a love for doing research; the continuing curiosity to ask questions answerable by the scientific method; the ability to ask a question, investigate, research; working together to achieve a team goal and within the team, framework attaining personal goals; a positive environment where novice researchers are supported and developed by experienced researchers; the environment in which academics attempt to advocate the active increase of scientific/academic knowledge; an environment; collective actions; not easily defined; a way of conducting research; an abstract concept (Adefuye et al., 2021); an investment; a process; a norm (Olvido, 2020); institutional policy; research infrastructure; collaborations; departmental culture; faculty involvement in research; working conditions for research; professional support (Mtshali & Sooryamoorthy, 2019); an open and supportive environment; a willingness of people to engage with research; values that promote intellectual challenges; obtaining the support to publish in top journals; collegiality; it is intangible; a space (Tucker & Tilt, 2019). For more details, see Table 3.

The perceptions cannot be considered as definitions, as they are not based on research but on opinion, though in most cases the one of experts. Most participants in the studies above were qualified as experts as they were professional researchers. Anyway, they give an idea of the expectations, hurdles and impressions that are common within a research community. They may be treated as potential components of research culture eligible for filtering and classifying.

Components of Research Culture

Though we purposefully extracted all component-like pieces from the publications under review (Table 4), some of the definitions also enumerated components of research culture (Table 2): behaviours, values, expectations, attitudes, norms (The Royal Society of science, 2018), environment, collective actions encouraging the spread of knowledge (Adefuye et al. 2021), belief, assumptions (Nadeem, 2011), research integrity, push for more open science (UKRI, 2022), shared values and basic assumptions concerning research (Hill, 1999), policies of journals, institutions, accreditation agencies (Frias-Navarro et al., 2020), capacity to undertake research, including skills, attitudes, competencies, understanding, and willingness to do research (Lodhi, 2012), an investment, a process, and a norm; observable and meas-

Table 2

Definitions Extracted from the Reviewed Publications

	Definitions of research culture	Extracted from	Cited
1	Research culture encompasses the behaviors, values, expectations, attitudes, and norms of our research communities. It influences researchers' career paths and determines the way that research is conducted and communicated	Adefuye et al., 2021	The Royal Society of Science, 2018
2	A set of values, beliefs, assumptions, and behaviors related to the implementation of research that is collectively owned by an organization	Adefuye et al., 2021	Nadeem, 2011
3	A major factor influencing research productivity in an academic faculty	Adefuye et al., 2021	Bland & Ruffin, 1992
4	Research culture encompass[ing] the behaviours, values, expectations, attitudes and norms of our research communities	Callard, 2023	The Royal Society of Science, 2018
5	UK Research and Innovation (UKRI), the non-departmental public body of the UK government in charge of research and innovation funding, meanwhile, is using the term research culture to prioritise research integrity, prevent bullying and harassment, champion equality, diversity and inclusion, and push for more open research	Callard, 2023	UKRI, 2022
6	The term 'research culture' emerged from the concept of 'organisational culture', which developed out of research and publications by social scientists in the 1970s–1980s	Callard, 2023	
7	(a)"Do we mean an organisational culture in which research plays a significant role? Do we mean "the way we do research round here?" Or do we mean a culture of the type found in a petri dish [...] ?" (b) includes a system of shared values and basic assumptions concerning research	Canti et al., 2021	Hill, 1999
8	Research culture encompasses all behaviours, values, expectations, attitudes and norms of research communities	Canti et al., 2021	The Royal Society of Science, 2018
9	Research culture is the mere set of values and conducts observed in the context of the scientific and innovation process	Canti et al., 2021	
10	Academic scientific research has its own culture made up of distinct aspects that help identify it and distinguish it from other academic fields, such as history	Dewey et al., 2022	Taras et al., 2009
11	Research culture refers to a set of actions carried out by all the actors or agents that form part of scientific research and communication: policies of journals, institutions, accreditation agencies, and the entities that support or finance the studies (ministries, private entities), and researchers	Frias-Navarro et al., 2020	
12	A research culture is emerging but not yet clearly defined	Given et al., 2022	
13	An environment within an organisation that enables and supports research to generate new knowledge and opportunities to translate evidence into practice	Iweka & Hyde, 2023	Alison et al., 2017
14	An institution's research culture is the "shared values, assumptions, beliefs, rituals, and other forms of behaviors whose central focus is the acceptance and recognition of research practice and output as valued, worthwhile, and preeminent activity."	McCann & Schneiderman, 2019	Evans, 2007
15	Research culture encompasses the behaviours, values, expectations, attitudes, and norms of our research communities. It influences researchers' career paths and determines the way that research is conducted and communicated	McKenna, 2023	The Royal Society of Science, 2018
16	Research culture is defined as "a culture in which the application of evidence is valued, clinicians are encouraged to participate in research-related activities, opportunities are available for staff to acquire skills in research and evidence-based practice, research achievements are recognised and there is an investment of resources in research activity"	Migliorini et al., 2022	Harding et al., 2017
17	Scholars have defined university research culture (URC) in three main ways. Taking an agency position, some researchers define URC as "an individual's capacity to undertake research activities" (Lodhi 2012: 474). Capacity here comprises the individual's skills, attitudes, competencies, understanding, and willingness to do research.	Nguyen & Marjoribanks, 2021	Lodhi, 2012
18	From a structural lens, by contrast, some researchers consider URC as an environment in which research grows and multiplies (Ryan and Hurley 2007). Environment refers to a set of strategies a university develops and implements to foster research output.	Nguyen & Marjoribanks, 2021	Ryan & Hurley, 2007

	Definitions of research culture	Extracted from	Cited
19	From a third, cultural viewpoint, researchers define URC as "shared values, assumptions, beliefs, rituals and other forms of behavior whose central focus is the acceptance and recognition of research practices and output as a valued, worthwhile and preeminent activity" (Evans 2007: 2, as cited in Lodhi 2016)	Nguyen & Marjoribanks, 2021	Evans, 2007 as cited in Lodhi, 2016
20	Research culture defined as shared values, assumptions, beliefs, rituals, and other forms of behavior geared towards the acknowledgment of the value and significance of research practice and its outputs	Olvido, 2020	Evans, 2007
21	Research culture is defined through observable and measurable indicators, which forms part of what a phenomenon is	Olvido, 2020	
22	Research culture is evidence-based. Its existence can't be assumed, but it has to be proven. These pieces of evidence come in two major categories: inputs facilitated by research-driven policies, and outputs that reflect development-oriented outcomes	Olvido, 2020	
23	Shared values, assumptions, beliefs, rituals, and other forms of behavior geared towards the acknowledgment of the value and significance of research practice and its outputs	Olvido, 2021	Evans, 2007
24	The research culture and the organisational culture (of which it is a part) provide the milieu - values, behaviours, and practices - within which scholarly activity takes place	Puplampu, 2021	
25	Evans sees research culture as an institutional framework which places value on research activities and outputs	Puplampu, 2021	Evans, 2007
26	Research culture encompasses the behaviours, values, expectations, attitudes and norms of our research communities[1]	Silva, 2023	University of Aberdeen, 2023 → The Royal Society of Science, 2018
27	A research culture is a culture that looks towards new knowledge and new research for addressing problems identified by the research community, industry, social activists, the policy makers, and the public at large. Also, it incorporates a tradition of interrogating existing knowledge and exploring alternative ways of understanding issues from different perspectives	Silva, 2023	
28	Research culture has a status of conventional wisdom in academic accounting discourse, but the very term 'research culture' carries with it an implicit expectation of an 'ideal' way in which research outcomes within university accounting schools can be facilitated	Tucker & Tilt, 2019	
29	Productive researchers are likely to work within particular environments they consider are conducive to, and compatible with, generating 'good' research and research outcomes – something commonly referred to as a 'research culture'	Tucker & Tilt, 2019	Hopwood, 2002
30	Definitions of research culture tend to be broad so as to suggest a level homogeneity in understanding of the concept	Tucker & Tilt, 2019	
31	The set of values, beliefs and assumptions that a community of researchers has in common regarding the nature and conduct of research	Tucker & Tilt, 2019	Kuhn, 1977
32	Policies and practices affecting recruitment, workload, evaluation, collegial communication, leadership, and structure	Tucker & Tilt, 2019	Dill, 1986
33	The many, often subtle, 'point-sized' rules and customs of research activity picked up and repeated by organizational members until their actions 'blend' into a collective attitude	Tucker & Tilt, 2019	Hauter, 1993
34	A common perception about research held by the organization's members	Tucker & Tilt, 2019	Robbins et al., 1994
35	Shared attitudes and values in an academic unit as related to research performance	Tucker & Tilt, 2019	Dundar & Lewis, 1998
36	A pattern of basic assumptions about research – invented, discovered, or developed by a given group as it learns to cope with the external and internal problems of research – that has worked well enough to be considered valid and therefore, to be taught to new members as the correct way to perceive, think and feel in relation to research problems	Tucker & Tilt, 2019	Hill, 1999

[1] Though, the definition cited as made by University of Aberdeen, it originally belongs to The Royal Society of Science.

	Definitions of research culture	Extracted from	Cited
37	Disciplinary or interdisciplinary ideas and values, particular kinds of expert knowledge and knowledge production, cultural practices and narratives (for instance how research is done, and how peer review is exercised), departmental sociability, other internal and external intellectual networks and learned societies	Tucker & Tilt, 2019	Deem & Brehony, 2000
38	Shared values, assumptions, beliefs, rituals and other forms of behavior whose central focus is the acceptance and recognition of research practice and output as valued, worthwhile and pre-eminent activity	Tucker & Tilt, 2019	Evans, 2007
39	The degree of emphasis that an individual or organization puts on research as compared to other academic activities, like teaching, administrative work or an engagement with practice	Tucker & Tilt, 2019	Messner, 2015
40	Research Culture: thinking through "culture" and "practice" as twin notions that mediate the relation between individuals and the institutional contexts in which they act	Valkenburg et al., 2021	
41	Ellis (2015) identifies research culture as the realm where perverse publication incentives compromise integrity, notably through specific reward structures	Valkenburg et al., 2021	Ellis, 2015
42	In Anderson et al. (2007), the notion of culture emerges chiefly as a normative ideal of science, that is handed over to the individual through mentorship and education	Valkenburg et al., 2021	Anderson et al., 2007
43	Knorr Cetina (1999) has argued that cultures, at the level of research practices, engender specific styles of knowledge production, and therefore need to be attended to when explaining the production of scientific knowledge. She posits that three properties can be attributed to such research cultures	Valkenburg et al., 2021	Knorr Cetina, 1999

Table 3

Perceived Research Culture in the Reviewed Studies

	Perceived research culture	Extracted from
1	**Research culture is defined as perceived by the study's participants:** - *part of daily doing within an institution (i.e., actions);* - *an enabling and supportive environment that stimulates research and fosters mentoring;* - *collective actions that encourage the expansion of knowledge* *Some excerpt from participants' responses* - *Research culture, in my mind, refers to how research is 'part of daily doing' within an institution. It refers to how people talk about research, how they go about doing research, how they work toward promoting research, and how they are supported in research.* - *According to my understanding, research culture will be the manner "norm" in which individuals follow in the process of carrying out their research. More like unwritten guidelines that are there yet not formally communicated, but people have that sync relationship toward it.* - *An atmosphere of continuous research.* - *An enabling and supportive environment that stimulates research through critical thinking, questioning, curiosity, finding solutions to problems, trying something new, encourages research.* - *A love for doing research - motivating people to do it not because you are forced to, but because you enjoy it.* - *The continuing curiosity to ask questions answerable by the scientific method.* - *The ability to ask a question, investigate, research (sic). And get an answer.* - *Working together to achieve a team goal and within the team, framework attaining personal goals.* - *A positive environment where novice researchers are supported and developed by experienced researchers; continuous process until novice is experienced and process as a mentor begins.* - *Research culture refers to the environment in which academics attempt to advocate the active increase of scientific/academic knowledge.*	**Adefuye et al., 2021**

	Perceived research culture	Extracted from
	- *This environment or culture is dependent on factors, which may adversely affect or positively encourage the undertaking of research by individuals and entities within a broader context.* - *The collective actions of formal and informal social structures that directly or indirectly stimulate the expansion of knowledge through the intellectual exchange; and maintain the infrastructure and processes that underlie the development, refinement, and communication of new knowledge.* - *A research culture exists when persons willingly continue to engage with applicable research work with resultant outputs in the form of, e.g., publications in journals, book chapters, and even change in professional and educational practice.* - *Not easy to define -depends on what is meant. Broadly, research culture is required if research is to be a priority. For me, it would mean that research is considered essential and that the concept of research is nurtured, and researchers are considered as skilled scientists with ethical principles.* - *A way of conducting research that is determined by an ever-changing expanding set of values, attitudes, norms, and interpersonal factors. It is an abstract concept that is dynamic and is defined and determined by the research.* - *From opportunities to teach, develop your skills, and present your work, to networking and social events, alongside dedicated research student support facilities, you can find the resources to help you make a distinct and significant contribution to your field.*	
2	**Research culture is perceived to be:** - *an investment (evidence-based and consists of observable and measurable inputs and outputs);* - *a process (dynamic and built through internal and external interactions that are developmental and systemic);* - *a norm (distinct to the institution because standardization of practices is contextualized)*	**Olvido, 2020**
3	**Perceptions of institutional research culture:** - *Institutional policies for research agenda are in place* - *Forms policies for research benefits and incentives* - *Builds research culture through research committees* - *Builds research infrastructure* - *Employs adjunct professors* - *Research budget is provided* - *Initiates collaborations with other* - *Creates research chair positions* - *Departmental culture and working conditions for research* - *Faculty involvement in research* - *Programme director support for research* - *Allocation of more time for research* - *Professional support and guidance*	**Mtshali & Sooryamoorthy, 2019**
4	**Interviewees' definitions of research culture:** - *An open and supportive environment in which people are willing to share, challenge and critique ideas* - *A willingness of people to engage with research* - *An environment in which people do research – not because they have to, but because they want to* - *A setting in which people are genuinely passionate about research and are supported by the institution to pursue their interests which will ultimately be published* - *Where the ethos is that research is important, valued and rewarded* - *Values that promote intellectual challenges, cross-fertilization of ideas, and advancing thinking – and (most importantly), publishing* - *Obtaining the necessary support to publish in top journals*	**Tucker&Tilt, 2019**

Perceived research culture	Extracted from
- *Schools in which people get excited by the prospect of searching the unexplored – where intellectual curiosity is fostered, and encouraged for its own sake, and not just to satisfy short-term KPIs* - *Collegiality – being surrounded by colleagues who are ready, willing and able to help you do good research* - *A shared belief that doing good research is how you contribute to the fundamental aims of the Department* - *It is intangible but real. I think of it as a department/school giving primacy to the research mission. This is not to say that teaching/service are under-valued but research contribution becomes the currency of the realm in terms of reputation/influence/compensation* - *An environment that champions curiosity, intellectual stimulation and is appreciative of diversity* - *A space that enables inquisitive people are able to enquire, question, debate and discuss matters of importance to the discipline, the University, and society at large*	

Table 4

Components of Research Culture Extracted from the Reviewed Publications

	Components of research culture	Extracted from
1	Community, academic, managerial, and value-oriented functions of research	Adefuye et al., 2021
2	Data access and research transparency replication; openness and transparency across the following aspects of research design and reporting: Citation standards, Data transparency, Analytic Methods (Code) Transparency, Research Materials Transparency, Design and Analysis Transparency, Study Preregistration, Analysis Plan Preregistration, Replication; open data repositories	Basile et al., 2023
3	*Supportive personal traits* including determination, self-motivation, discipline, an internal drive; being an organized and detailed person; taking the initiative around research; natural curiosity; being willing to advocate for self-motivation;	Borders et al., 2019
4	*Career sustainability:* healthy competition, openness, mobility (in terms of diversified career paths), wellbeing	Canti et al., 2021
5	*Open research values*: accessibility reusability reproducibility collaboration transparency	Catt & Smith, 2023
6	*Many layers of research culture*: mainstream culture outside an institution overarching climate of different institutions departmental cultures microcultures created in research labs individual cultures	Dewey et al., 2021
7	*Three categories of research culture*: Practices, Norms/Expectations, Values/Beliefs	Dewey et al., 2022
8	*Three layers of collaborative research culture*: the roots of collaboration the fields of collaboration the fruits of collaboration trust and respect	Gasson & Bruce, 2019

	Components of research culture	Extracted from
9	Benefits and incentives research progress human resource management policy research policy research progress collaboration research funding	Ghozi et al., 2023
10	Networking, research collaborations, a research environment	Hartvigson & Heshmati, 2023
11	Research productivity	Heng et al., 2022
12	Indicators (key performance indicator; amount of research grant acquired, number of PhD students graduated, the number of intellectual properties registered); research capability; research productivity; research excellence; research assessment	Henry et al. (2020)
13	Domestic networks and various research associations research capacity individuals with a strong passion and dedication to research scientific collaboration (formal and informal)	Hoang & Dang, 2022
14	Research results (often measured by the quantity and quality of publications)	Johann, 2022
15	Research facilities a research-friendly climate institutional autonomy recognition academic staff competence time for research availability of financial resources	Kadikilo et al., 2023
16	A sense of belonging, shared purpose and mutual respect	Khuram, 2024
17	Responsible conduct of research	Laas et al., 2022
18	Research quality accountability to the research community and to society publishing in top journals obtaining research funding from prestigious institutions launching a groundbreaking book successfully funding launching a center of research excellence	Lindgreen et al., 2023
19	Nine areas for improving integrity: research environment, supervision and mentoring, research integrity training, research ethics structures, dealing with breaches of research integrity, data management, research collaboration, declaration of interests and publication and communication; characteristics of a responsible research climate: fair evaluation, openness, sufficient time, integrity, trust, and freedom are essential	Lõuk, 2023
20	Resources, rewards, sufficient work time, clear coordinating goals, size/experience/expertise, mentoring, communication, research emphasis, recruitment and selection of faculty, positive group climate, communication with a professional network, assertive-participative governance, development opportunities, and decentralized organization	McCann & Schneiderman, 2019
21	Autonomy and freedom; care and collegiality; collaboration; equality, diversity and inclusion; integrity and ethics; and openness and transparency (Science Europe) zero tolerances of inappropriate behaviour, a safe and supportive research environment, fair opportunities for career advancement, and common courtesy and kindness	McKenna, 2023
22	Three levels of research culture: organisation, team and individual	Migliorini et al., 2022

	Components of research culture	Extracted from
23	Institutional policies for research agenda policies for research benefits and incentives research committees research infrastructure employs adjunct professors research budget is provided initiates collaborations with others creates research chair positions departmental culture and working conditions for research faculty involvement in research programme director support for research Allocation of more time for research professional support and guidance	Mtshali & Sooryamoorthy, 2019
24	Skills, efficacy, values, institutional practices, and individual behaviours	Puplampu, 2021
25	Research productivity as part of research culture in higher education institutions	Rogayan & Corpuz, 2022
26	Research excellence	Salameh et al., 2022
27	Research integrity, research ethics, responsible conduct	Satalkar & Shaw, 2019
28	Responsible conduct of research methodological rigour, transparency, and fair peer review inquisitiveness and integrity	Valkenburg et al., 2020

urable indicators (Olvido, 2020), an institutional framework (Evans, 2007), rules and customs of research activity (Hauter, 1993), and basic assumptions about research (Hill, 1999).

The components of research culture offered by various researchers entail multilevel and heterogeneous items. It is explained by the complex nature of research culture. Neither a structure nor a classification of research culture components was detected in the publications under review. Attempts were made to offer a level-based structure, though simplified. As the extracted data proved, research culture may be composed of layers (Dewey et al., 2021) that included a combination of cultures of all research-related institutions and individuals. The other found approach included levels: organization, team, and individual (Migliorini et al., 2022).

DISCUSSION

Defining Research Culture

Though today many definitions of research culture exist, there are few more or less uniform wordings (The Royal Society of Science, 2018; Evans, 2007) with most offered before the period of the review (2019-2024) and cited in the reviewed documents (see Table 3). As we found out a majority of definitions are made up on the basis of some rationale or for an exact purpose. Focusing on part of research culture or concepts within or overlapping research culture tends to be linked to the aims of studies. On the whole, total universality of definitions is hardly approachable.

A uniform definition of the term provides for consistency in understanding and an interpretation of research culture in various academic and scientific environments. It facilitates compliance of research in the affiliated research field and increases the research comparability. When researchers and research institutions stick to uniform perceptions of the term, their communication and collaboration become more fruitful even when it comes to different disciplines and national cultures. This aspect grows in its importance in the context of international interdisciplinary research projects and teams. The clear and comprehensive definition supports educational institutions and policymakers in forging their strategies aimed at cultivating and fostering a healthy, non-toxic research culture. Innovations and progress in science can be attained only in such a culture.

Framework of Research Culture Components

Though only a few studies in the review aimed to build up a structure of research culture, all boiled down the structure to several components: three categories – Practices, Norms/Expectations, Values/Belief (Dewey et al., 2022); three layers of collaborative research culture – The roots, the fields, and the fruits of collaboration (Gasson & Bruce, 2019); and layers of research culture – mainstream culture outside an institution, overarching climate of different institutions, departmental cultures, microcultures created in research labs, and individual cultures. The findings are in close compliance with the previous research where a framework of the development of a research culture was constructed in the similar tune and entailed three domains: (1) The three missions of the university – "Trifocal function University"; (2) the individual researcher's knowledge, skills, values, and attributes

– "Individual attributes"; (3) all characteristics of the university – "Institutional Attributes and Policies" (Johnson & Louw, 2014).

An endless list of components put up above as our finding brought us to a challenge to build up a framework, covering all components in terms of both levels and concepts. The methodological problem of such a classification of components is linked to heterogeneity and diversity of components. All the enumerated components both as part of definitions and extracted from the publications as components may be boiled down to the following groups (see Table 4).Thus, the major groups of research culture components embrace stakeholders (agents), values, behaviours, capacities & personal traits, environment, policies, processes, assessment & indicators, and research performance. All the groups are applicable to institutions, teams and/or individuals. The central group "Stakeholders" is influenced by the three groups above – "Behaviours", "Values", and "Capacities & Personal Traits". The groups on the right and left – "Environment", "Processes", "Assessment & Indicators", and "Policies" – form the research conditions. The group below "Stakeholders" is "Research Performance". Its components describe all outcomes and contributions.

While selecting all the structure-related items, we classified all key components and more detailed elements that formed part of the bigger groups throughout the review findings. For instance, determination, self-motivation, discipline, and internal drive (Borders et al., 2019) were included as an integral part of personal traits.

Structure of Research Culture as Reflected in Its Conventions

Though definitions may be approached differently - from an agency position, through a structural lens, and from a cultural viewpoint (Nguyen & Marjoribanks, 2021), we came down to thinking that a comprehensive definition should be a complex description combining all of them. Based on the findings of this review and our extrapolated notion of the concept, we have come to the following definition of research culture. *Research culture* entails stakeholders (an agent perspective) related to research in their interactions with values, behaviours, capacities & personal traits, environment, policies, processes, and assessment & indicators, resulting in research performance (structural and cultural approaches).

Better understanding of research culture results in more efficient instruments of assessment and improvement of research practices in educational institutions and research organisations. It is vital for higher-quality research performance, more attractive and efficient instruction and training. Based on a clear-cut and deep comprehension of research culture components, universities and research institutions are able to carry out and implement measures that support building and fostering research culture. The latter provides for growing academic communities and their sustainability in the long term.

Limitations and Further Research

Possible omission of relevant studies might have occurred due to the exclusion of non-English language studies. Another limitation arises out of the 5-year period of the reviewed publications. The results show that many authors thoroughly analysed the studies on research culture published during the previous 30 or more years. Those publications are widely cited in today's research. A review of publications dated back to the 1990s and later may add to the general understanding of the field. Although the Scopus database is comparatively comprehensive, other bases may broaden today's views of the problem field.

CONCLUSION

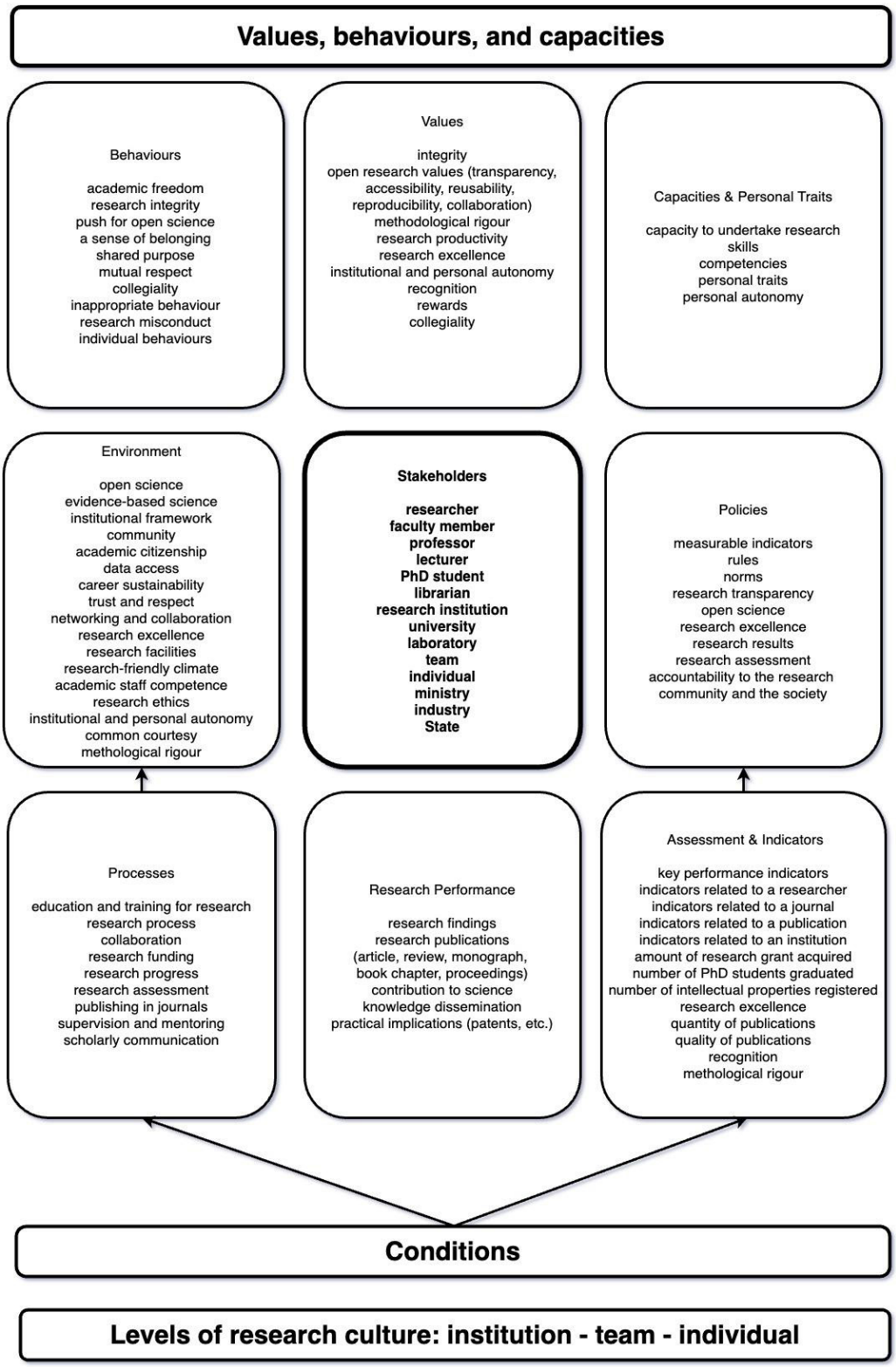
The exploration of the concept of research culture, an area of inquiry that has evolved over decades from the 1980s to the present, has recently intensified. This intensification is due to significant transformations within the research culture that impact all involved stakeholders. Our review successfully achieved its objectives and provided clear responses to the posed research questions, thereby enriching the academic discourse on this topic.

The study revealed that while the definitions and components of research culture identified were often fragmented and occasionally incomplete, they predominantly adhered to cultural, organizational, structural, and object-oriented approaches, aligning with the specific aims of the research from which they were drawn. Despite this fragmentation, our comprehensive analysis enabled the formulation of a more nuanced definition of research culture, capturing its multifaceted nature more effectively.

Furthermore, we developed a structured framework that categorizes the major components of research culture, which provides a clearer understanding of its complex dimensions. This framework and the insights gained from this nt academic and organizational needs.

Figure 4

Framework of Research Culture Components



AUTHORS' CONTRIBUTION

Elena Tikhonova: conceptualization, data curation, formal analysis, investigation, methodology, resources, software, validation, visualization, writing – original draft, writing – review & editing.

Lilia Raitskaya: conceptualization, data curation, formal analysis, investigation, methodology, resources, software, validation, visualization, writing – original draft, writing – review & editing.

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