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Research Article

Structured expert elicitation on disinformation, misinformation, and malign influence: Barriers, strategies, and opportunities

We used a modified Delphi method to elicit and synthesize experts' views on disinformation, misinformation, and malign influence (DMMI). In a three-part process, experts first independently generated a range of effective strategies for combatting DMMI, identified the most impactful barriers to combatting DMMI, and proposed areas for future research. In the second stage, experts deliberated over the results of the first stage and in the final stage, experts rated and ranked the strategies, barriers, and opportunities for future research. Research into intervention effectiveness was a strategy that received the highest level of agreement, while robust platform regulation was deemed the strategy of highest priority to address. They also identified distrust in institutions, biases, political divisions, relative inattention to non-English-language DMMI, and politicians' use of DMMI as major barriers to combatting DMMI. Vulnerability to DMMI was chosen by experts as the top priority for future study. Experts also agreed with definitions of disinformation as deliberately false/misleading information and misinformation as unintentionally so.

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Research questions

- To what degree do experts agree with emerging "standard" definitions of misinformation and disinformation?
- According to experts, what are the most effective strategies and practices for combatting and building resilience to disinformation, misinformation, and malign influence (DMMI)?
- What are the biggest challenges (or barriers) to combatting and building resilience to DMMI?
- What areas/topics for future actionable research on DMMI do experts identify as most promising?

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Essay summary

- We conducted a structured expert elicitation to synthesize experts' views on disinformation, misinformation, and malign influence (DMMI). Forty-two experts participated across all stages of the study, around half of which were academics from various disciplines while the remainder were professionals engaged with DMMI in some way (see Methods for more details).
- Experts largely agreed on definitions of the terms *misinformation* and *disinformation*, based on those found in Wardle and Derakhshan (2017).
- The top five priority strategies identified for combating DMMI were: 1) establishing regulatory frameworks for digital platforms, 2) improving media literacy and critical thinking, 3) raising awareness in schools about DMMI's dangers, 4) investing in research to understand and counter DMMI, and 5) fostering cross-sector collaboration.
- The main barriers highlighted were distrust in institutions, cognitive/emotional biases, political divides, inattention to non-English-language DMMI, and the use of DMMI by politicians for personal gain.
- The top five priority areas for future research were 1) research into individual and group vulnerabilities and building resilience to DMMI, 2) long-term research into the effectiveness of media literacy/critical thinking interventions, 3) research into the effectiveness of interventions on the general public, 4) research on emerging threats, including actors and technologies, and 5) interdisciplinary research to understand why people believe and spread DMMI.

Implications

DMMI are significant problems for civil societies around the world and are the focus of major research efforts and interventions by academics and professionals (journalists, educators, etc.). However, a major issue facing decision and policy makers, as well as academics, is what research areas and which interventions to prioritize. This is especially challenging because—unlike more mature areas of teaching, research, and practice, such as cyber-security, which has become a discipline in its own right—the study of DMMI is scattered among a variety of disciplines and professions ranging from psychology to journalism, each with their own specific perspectives, practices, and frameworks (Mahl et al., 2023; Nimmo & Hutchins, 2023). Thus, while recent research has highlighted major areas of agreement in the study of misinformation and related phenomena (Altay et al., 2023; Martel et al., 2024; Traberg et al., 2024), there is considerable disagreement about the most suitable interventions (Bateman & Jackson, 2024; Modirrousta-Galin & Higham, 2023; van der Linden et al., 2023). Thus, despite years of research, there remain pervasive research gaps, especially as to the efficiency of differing interventions (Aïmeur et al., 2023; Farhoudinia et al., 2023). All of this highlights the need for a more strategically intertwined research and intervention program, but the question, then, is how best to identify priority areas of research and the most promising interventions, despite research gaps and uncertainties. We need to move fast and fix things.

Expert elicitations are commonly used for situations involving complex problems, where there is considerable uncertainty, a relative lack of data, and where there are active debates among experts on substantive issues, but where prediction, decisions, and/or policies need to be made rapidly (Fraser et al., 2023; Martin et al., 2012).

In this article, we do not seek to lay out a prescriptive roadmap for combatting and building resilience to DMMI, but, instead, seek to provide the aggregated, considered judgements of experts on key questions relating to DMMI to assist decision and policy makers in their tasks. The key questions we sought to answer were:

- What are the most effective strategies or practices for combatting and/or building resilience to DMMI?
- What are the important factors, challenges, or opportunities that impact combatting and building resilience to DMMI?
- What are the most important areas/topics for future actionable research on DMMI?

Additionally, previous research has highlighted disciplinary differences in definitions of misinformation as well as the use of *disinformation* and *misinformation* as umbrella terms. Based on our experience in the area, as well as on a review of the relevant literature, we have observed that many (though not all) researchers and practitioners have adopted with slight variations definitions of misinformation and disinformation that hinge on intent (Wardle & Derakhshan, 2017). Indeed, most experts in our survey agreed with these definitions, confirming our view that these terms are becoming the "standard" definitions, even if many experts continue to use the terms *misinformation* or *disinformation* as umbrella terms, and others prefer to leave aside the issue of intentionality (van der Linden, 2022). This highlights the need for better umbrella terms—hence our use of DMMI.

Many interventions and strategies to combat and build resilience to DMMI have been proposed, but there is scholarly disagreement about which interventions are the most effective, in what circumstances, and at what scale. On the other hand, when surveyed, experts have also shown a tendency to agree that most deployed interventions would be effective, at least to some degree (Altay et al., 2023). Calls for multiple approaches (Bak-Coleman et al., 2022) and whole-of-society approaches (e.g., Murphy, 2023) to the problems of DMMI are common in the literature but policy makers, platforms, and funding institutions need to be able to make decisions now, not only about which evidence-based interventions to prioritize but about what research to prioritize in such a whole-of-society and generational effort (Bateman & Jackson, 2024).

The results of our elicitation process are consistent with those found in Altay et al. (2023) in that our experts agreed that a wide variety of strategies for combatting and building resilience to DMMI could be effective. Additionally, when asked which interventions should be prioritized over the next five years, experts believed that the top priority should be a more robust regulatory framework for social media companies to be overseen and enforced by a dedicated standards body. This was followed by improving media and information literacy (including critical thinking) and by raising awareness about the dangers of DMMI (especially in schools).

There were also some more surprising results. For example, experts ranked improving support and outreach to communities fifth in potential efficacy, but only 14th in terms of priority. Moreover, although our panel thought investment in DMMI research would be the most effective strategy, they thought that regulating social media companies and improving education should be a higher priority. The implication here is that decision and policy makers should prioritize both regulatory and educational intervention—they are thought of as both effective and a high priority.

Experts also identified many barriers to combatting and building resilience to DMMI. And, more so than any other barrier, experts agreed that the increasing use of DMMI by malicious state actors was a significant barrier to building resilience to DMMI. But when asked to prioritize which barriers should be focused on in the next five years, the number one choice was distrust in institutions and media. One implication here is that while malign state actors are seen as a major problem, the experts think that the best way to build resilience is to focus on building trust in institutions and the media.

Experts also identified and ranked priority areas for future research: research on emerging threats, research to better understand the effectiveness of media literacy and how best to teach it, interdisciplinary research on why people believe and spread dis/misinformation, and research into better audit methods for algorithms. However, of these, only research into media literacy/educational programs in schools was seen as a top five priority by the majority of our experts. The most frequently selected area

to prioritize by our panel was research into how and why individuals/groups are vulnerable to DMMI. These results together suggest that research into interventions that focus on those most vulnerable to DMMI (specific individuals/groups and school children) would be promising avenues for future research.

The identification and ranking of barriers, strategies, interventions, and areas for future research by our experts are presented in more detail in the following section. These will help decision and policy makers better plan research programs and prioritize interventions.

Findings

Finding 1: Definitions of disinformation and misinformation.

During the exercise, experts noted there was a need for consistent, agreed-upon definitions of key terms in the DMMI space. To address this, our final survey asked participants to indicate their level of agreement with definitions of disinformation and misinformation derived from Wardle and Derakhshan (2017) using a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). As shown in Figure 1, we found broad agreement among our expert panel on the proposed definitions:

1. *Disinformation* is deliberately false or misleading information. The intent may be to harm, coerce, exploit, deceive, etc.
2. *Misinformation* is false, misleading, or manipulated information but is shared with no intent to harm, deceive, exploit, coerce, etc.

However, discussions between experts highlighted that these definitions are not perfect, for example, something may start as disinformation and be spread as misinformation and vice versa. Interestingly, the level of support for the definition of disinformation was stronger than for misinformation. This may reflect changing patterns in the use of these terms, where misinformation may be used as an umbrella term, which does not necessarily imply intent but does not exclude it either. Nevertheless, these findings support the view that these definitions are emerging as the standard consensus definitions of these terms.

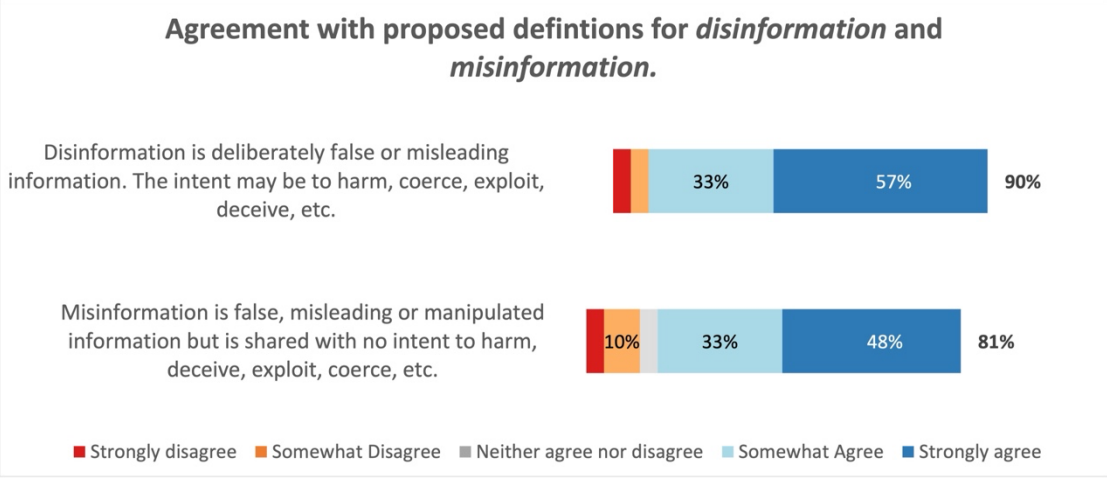

Figure 1. Expert panel agreement with proposed definitions for disinformation and misinformation. *Percentages are calculated based on the total number of responses (*n *= 42). Some questions were not answered, so the totals may add up to less than 100%. Percentages in bold to the right of each bar represent the combined percentage of the largest response bloc (i.e., strongly disagree + somewhat disagree OR somewhat agree + strongly agree). Percentages of 5% or less are not displayed on the chart.*

Finding 2: Strategies for combatting and/or building resilience to DMMI.

We then asked participants to express their level of agreement with statements describing strategies for combatting DMMI that emerged from Phases 1 and 2 of our process. Statements and their levels of agreement are shown in Figure 2. The strategy that garnered the most agreement (93%) was related to investing in research to improve our understanding of DMMI and to evaluate the effectiveness of interventions. Two strategies related to education and training—specifically, improving media and information literacy (90%) and raising awareness in schools about the dangers of DMMI (90%)—also received strong support. Additionally, 90% of experts agreed that establishing and enforcing a robust regulatory framework for social media companies is an effective strategy. A slightly lower, but still practically significant, level of agreement (86%) was observed for increasing collaboration and coordination between sectors, including academia, civil society, government, and private companies.

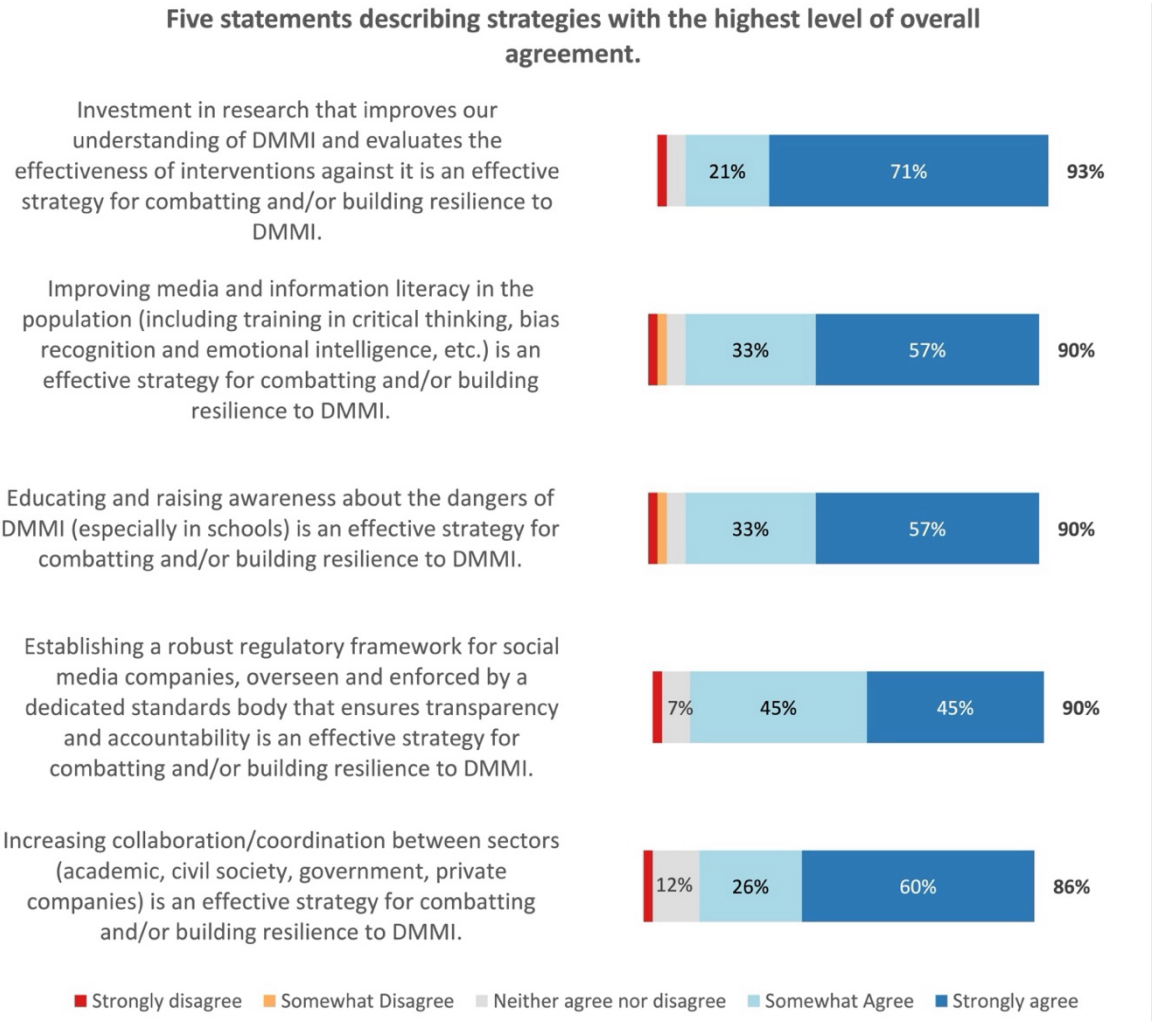

Figure 2. Expert panel agreement with statements describing effective strategies for combatting and/or building resilience to DMMI. *Percentages are calculated based on the total number of responses (*n = *42). Some questions were not answered, so the totals may add up to less than 100%. Percentages in bold to the right of each bar represent the combined percentage of the largest response bloc (i.e., strongly disagree + somewhat disagree OR somewhat agree + strongly agree). Percentages of 5% or less are not displayed on the chart. See Appendix C for full chart.*

Finding 3: Prioritizing effective strategies over the next five years.

We asked panelists to select up to five strategies to prioritize over the next five years and then rank those selected in terms of priority (see Figure 3). The strategies most frequently prioritized were largely consistent with the top strategies identified earlier. However, there was a notable distinction: While "Establishing a robust regulatory framework for social media companies" ranked fourth in terms of agreement as an effective strategy—indicating broad consensus amongst experts on its potential impact—it was selected most frequently as the top priority for implementation over the next five years. This suggests that, despite not being seen as the most effective strategy overall, experts viewed it as the most urgent for practical action in the near term.

The ranking of strategies by priority over the next five years revealed further insights. For example, both education-related strategies—"Improving media and information literacy" and "Educating and raising awareness about the dangers of DMMI, especially in schools"—were selected as priorities 22 times each. However, "Educating and raising awareness" was ranked as the highest priority by 50% of participants who selected the strategy as a priority compared to only 14% for "improving media and information literacy." Additionally, although "increasing collaboration between sectors" was the fifth most selected strategy, it was rarely ranked as the first, second, or third priority.

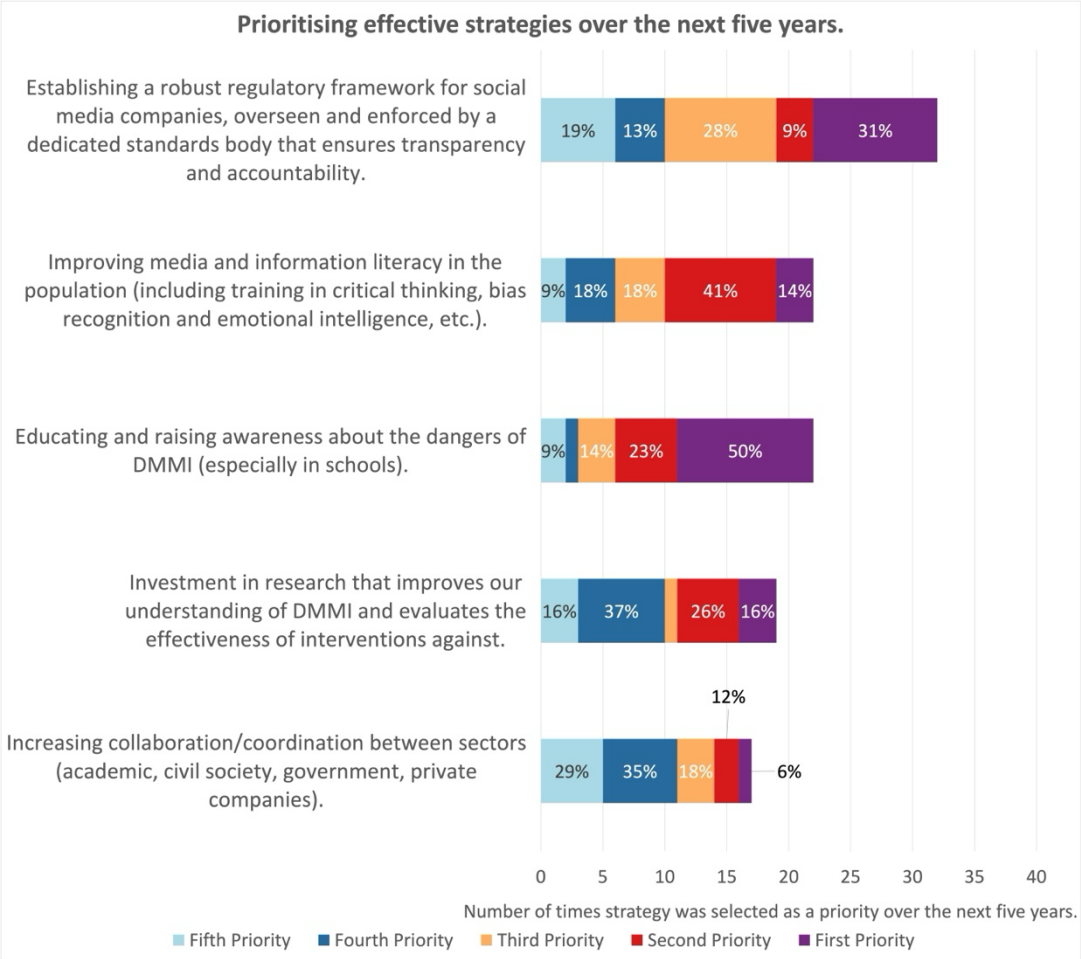

Figure 3. Results of the exercise where the expert panel was asked to select five strategies to prioritize over the next five years and then rank those selected in terms of the highest priority. *Length of bar indicates number of times the strategy was selected as a priority, and percentages indicate proportion of participants that ranked strategy as first, second, third, fourth, or fifth in terms of priority. Percentages less than 10% are not displayed. See Appendix C for full chart.*

Finding 4: Factors that significantly impact the ability to combat and/or build resilience to DMMI.

We asked participants to express their level of agreement with the various barriers to combatting DMMI that emerged from Phases 1 and 2 of our process. As expected, many barriers were identified, and many of these received broad levels of agreement. The top five barriers, based on level of agreement, were:

1. The increasing use of DMMI, especially by state actors
2. Inadequate understanding of the causes and effects of DMMI
3. Distrust in institutions and the media
4. Politicians who might be capable of addressing the issue often traffic in DMMI for their own benefit
5. Cognitive and emotional biases and vulnerabilities

Interestingly, there was substantive discussion between experts of the information deficit model—problems with it, and whether it nevertheless captured some important aspects of the problem. In the online survey, these two positions, summarized as "reliance on the deficit model is a barrier to combatting or building resilience" and "the information deficit model, while incomplete, contributes to a useful understanding of DMMI" received very similar, but low levels of agreement, with approximately 43% and 42% respectively.

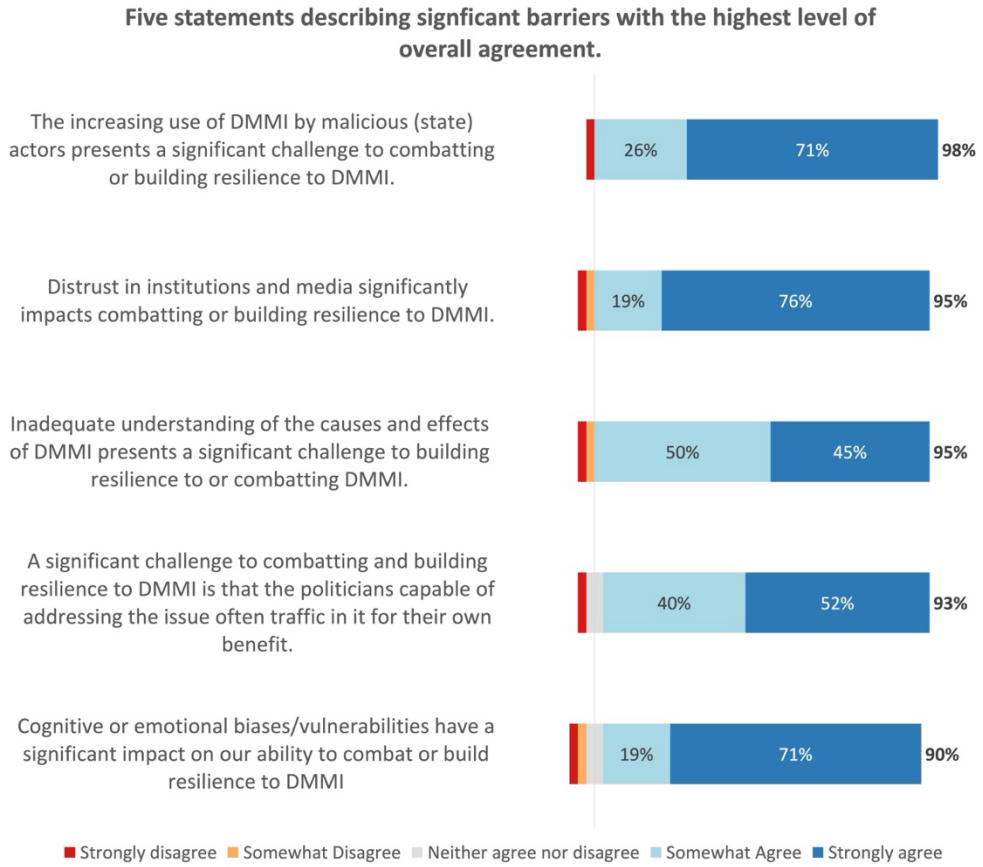

Figure 4. Expert panel agreement with statements describing barriers that significantly impact combatting and/or building resilience to DMMI. *Percentages are calculated based on the total number of responses (*n = *42). Some questions were not answered, so the totals may add up to less than 100%. Percentages in bold to the right of each bar represent the combined percentage of the largest response bloc (i.e., strongly disagree + somewhat disagree OR somewhat agree + strongly agree). Percentages of 5% or less are not displayed on the chart. See Appendix D for full chart.*

Finding 5: Ranking barriers that most impact combatting and building resilience to DMMI.

In addition to ranking barriers by the level of agreement among experts, we asked participants to identify the five most important or impactful barriers for the next five years and to rank them in order of significance. This exercise yielded a somewhat different list from the previous findings, with the five most frequently selected barriers being:

1. Distrust in institutions and media
2. Cognitive and emotional biases and vulnerabilities
3. The worsening political/ideological divide in society
4. The relative inattention paid to non-English language DMMI
5. The use of DMMI by the very politicians who might be capable of addressing the problem

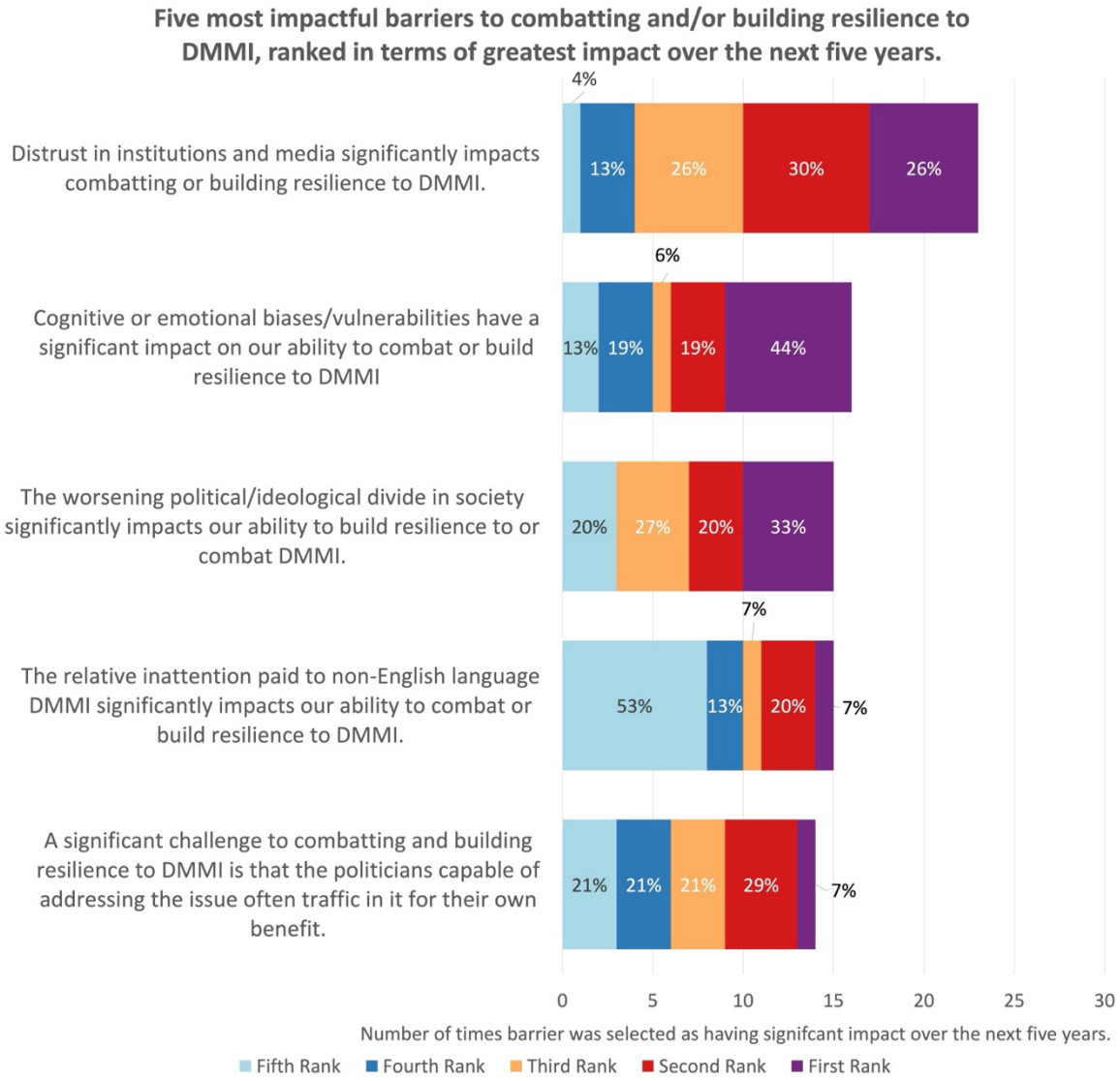

Figure 5. Results of the exercise where the expert panel was asked to select five barriers that will have the most impact on the ability to combat and/or build resilience to DMMI over the next five years and then rank those selected in terms of the greatest impact. *Length of bar indicates number of times the strategy was selected as a priority, and percentages indicate proportion of participants that ranked strategy as first, second, third, fourth, or fifth in terms of priority. Percentages less than 10% are not displayed. See Appendix D for full chart.*

Finding 6: Areas for future research to be prioritized over the next five years.

That more research is needed with regard to disinformation, misinformation, and malign influence is a common refrain among experts, but after eliciting these areas in the first phase, we asked experts to select which future research areas should be prioritized over the next five years and then rank those selected in terms of the highest priority. These are the areas selected most often as an area to prioritize over the next five years (see Figure 6):

1. Research is needed to understand how and why different individuals and groups are vulnerable to DMMI and how best to build resilience in these groups.
2. More long-term research/evaluation is needed to understand what kinds of educational interventions (media literacy/critical thinking, combinations thereof etc.) work best to counter and build resilience to DMMI.
3. Research is needed to understand how effective various media literary and critical thinking curricula and initiatives are, and how best to teach/improve media literacy and critical thinking in schools as well as to the general public.
4. Research is needed on emerging threats, including actors and technologies, and on the way DMMI may evolve in future.
5. More interdisciplinary research and collaboration is needed to address DMMI and understand why people believe and spread it.

Interestingly, although both options 1 and 2 were selected as an area to prioritize over the next five years 23 times, only 22% ranked 2 in their "top five." This suggests that although both 1 and 2 were seen as priority areas for future research, experts thought 1 was a higher priority than 2. Moreover, while both 2 and 3 refer to research investigating the effectiveness of media literacy/critical thinking interventions, 2 is specifically about research into their long-term effectiveness. This result suggests that our experts recognize the importance of prioritizing research into these interventions but that long-term research is not as much of a priority for them.

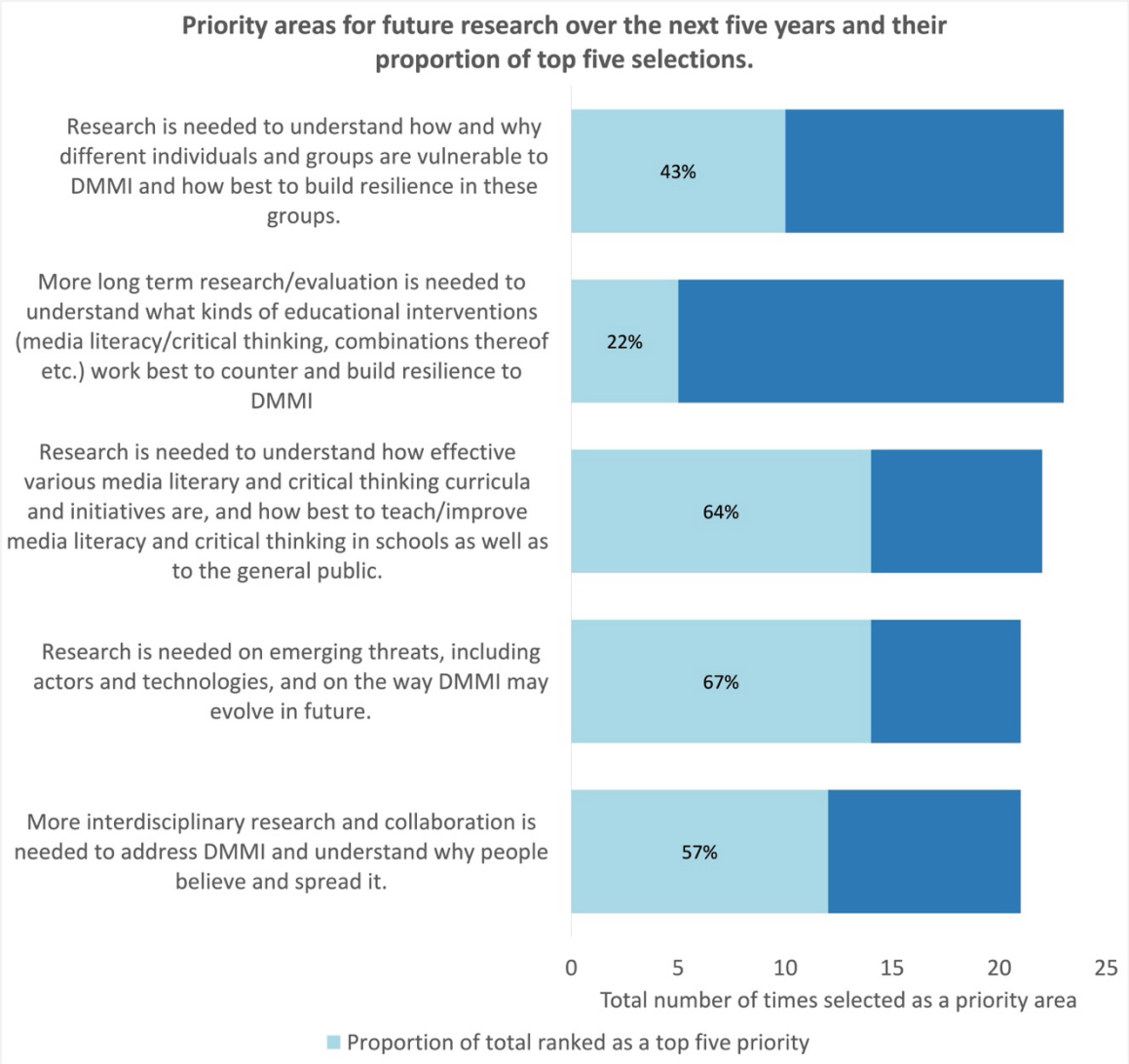

Figure 6. Results of the exercise where the expert panel was asked to select 5 areas for future research that should be prioritized over the next five years and then rank those in terms of the highest priority. *Each bar indicates the total number of times an area was selected as a priority as well as the percentage of the selections that were ranked as a top five priority. See Appendix E for full chart.*

Methods

Overview

Our study utilized a modified Delphi method, first described in Barnett et al. (2021), involving three phases to gather and refine expert judgments. Delphi processes are well-established elicitation techniques and offer reliable means of structuring group communication so that individuals, as a whole, can solve a common problem (Linstone & Turoff, 1975). Like all Delphi processes, our process shares the fundamentals of the method in that 1) it imposes/allows some level of anonymity to avoid undesirable psychological effects, 2) it is iterative, unfolding over multiple rounds, 3) between rounds experts are informed of other experts' responses in some way, and 4) group responses are statistically summarized at the end of the process (Rowe & Wright, 1999).

However, unlike most existing Delphis, our process has an exploratory first phase and a deliberative second phase.[2] An exploratory first phase allows the experts themselves to proffer the range of topics under consideration, rather than researchers predetermining which topics will be ultimately evaluated. This is especially important in emerging areas like DMMI, where it would be difficult to properly justify any predetermined list of, for example, effective strategies for combatting and/or building resilience to DMMI. To ensure the full range of potential topics is captured, our process starts with an exploratory phase.

Our process also includes a deliberative second phase, which helps experts reach a shared understanding of the topics before evaluating them in the final phase. Facilitating expert interaction is especially important when the experts represent a range of disciplines/professions, as ultimately experts will be asked to evaluate judgments from experts outside their own area. A deliberative second phase allows experts to share supporting arguments and evidence, ask questions, resolve ambiguities, and ultimately gain the understanding required to properly evaluate judgments outside their expertise in the final phase.

Participants

We invited 304 experts from diverse fields via targeted conference and institutional mailing lists, professional networks, and authorship in relevant publications to participate in all phases. We used a loose definition of *expert* (and made clear our definition in the invitation) as anyone with "expertise in combatting, mitigating, and building resilience to disinformation, misinformation, and malign influence." Participants were encouraged to forward the invitation within their professional networks but refrain from sharing the invitation on social media. The results of our recruitment efforts were 66 (25 female) experts from 20 different countries, all of whom provided their informed consent to participate. Experts averaged 7.7 years of experience, representing a diverse array of fields (see Table 1). The sample can be considered representative due to the strategic recruitment of experts from a range of fields related to disinformation, selected through targeted channels and professional networks that ensured diversity in geography, gender, and sector.

Table 1. *Number of experts by sector and field/profession.*

Sector	Field/Profession	Number of Experts
Academic	Psychology	8
	Computer Science	4
	International Relations	2
	Accounting	1
	Anthropology	1
	Information Science	1
	Political Science	1
	Philosophy	1
	Sociology	1
	Behavioral Science	1

[2] Delphis were originally designed to mitigate unwanted effects arising from committee processes by eliminating all interaction between experts (Linstone & Turoff, 1975; Rowe & Wright, 2001). Thus a distinct discussion phase is avoided by almost all Delphi designs. A notable exception is the IDEA Protocol, which is a quantitative Delphi design with a facilitated discussion phase.

Sector	Field/Profession	Number of Experts
Professional	Non-Profits	3
	Policy Analysis	3
	Journalism	3
	Education	3
	Media	2
	National Security	2
	Chaplaincy	1
	Fact Checking	1
	Public Relations	1
	Consultancy	1

Note: Our demographic questions were optional and 22 participants chose not to answer.

Design and Procedure

Phase 1: Generate

Experts were asked to submit up to five ideas in response to each of the three questions concerning effective DMMI strategies, key challenges, and crucial areas for future research (up to 15 ideas across the three questions). We received 791 ideas, which were thematically analyzed by the research team using an inductive, or bottom-up approach where themes are inferred from codes rather than fitting codes to predetermined themes (Braun & Clarke, 2006). Next, we drafted a synthesis statement for each theme identified in the data. A total of 84 statements were generated in Phase 1.

Phase 2: Discuss

Synthesis statements were uploaded to the online discussion forum Loomio as separate "pages," providing a self-contained space to discuss the statement. The forum remained open 24 hours a day for 10 days to give experts a chance to contribute to or review the discussion. Of the 66 experts invited to the forum, 48 accepted the invitation, and of those 48, 34 were actively engaged in discussion contributing at least one comment. In total, 243 comments were collected at the conclusion of Phase 2.

Phase 3: Assess

Following the discussion, statements were refined based on participant feedback, and a final survey was circulated. Participants rated their agreement with each of the 84 statements using a 5-point Likert scale (*strongly disagree* to *strongly agree*) and prioritized statements for future action. This phase concluded with 42 participants providing their evaluations, which informed the final analysis of the study.

While our study offers a comprehensive aggregation of expert opinions, several factors limit the generalizability of our results. First, since our sampling was non-random and purposeful, the sample favors experts within established professional networks, potentially underrepresenting less prominent but equally valid perspectives. Second, the majority of our sample was located in Australia, which may limit how generalizable the results are to other geographic areas. Finally, because of the highly dynamic nature of disinformation, misinformation, and malign influence, results may need to be reassessed in light of emerging technologies or actors.

Nevertheless, our structured expert elicitation has provided valuable insights into the challenges and strategies for combating DMMI. The experts agreed on key definitions and identified priority strategies, such as establishing regulatory frameworks for digital platforms, enhancing media literacy, and promoting

cross-sector collaboration. Significant barriers—including distrust in institutions, cognitive and emotional biases, and political exploitation of DMMI—were highlighted. Areas for future research were also identified, including research into emerging threats and the effectiveness of media literacy programs. Overall, these findings outline the need for a research program and priority interventions that include a mix of regulation, media and information literacy programs (and additional research into how best they can be effective), institutional trust building, and a priority focus on research into how best to build resilience in the groups most vulnerable to disinformation, misinformation, and malign influence.

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Competing interests
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Ethics
Participants provided informed consent before participating in any activity. This project has human research ethics approval from The University of Melbourne [ID 27056]. Participants were free to either ignore the question regarding their gender, select either male or female, enter their own text to self-describe, or select "prefer not to say."

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Data availability
All materials needed to replicate this study are available via the Harvard Dataverse https://doi.org/10.7910/DVN/Q2A1RF and OSF https://osf.io/bvxqc/

Appendix A: Sampling and demographics

The initial invite list of 304 potential participants was generated using purposeful sampling strategies, in particular, reputational sampling and snowball sampling. Reputational sampling strategies seek to identify participants who have in-depth knowledge (by reputation) of the topic (Patton, 2014). To identify such expert participants, we used targeted conference and institutional mailing lists, professional networks, and authorship in relevant publications. We then sent those experts an invitation to participate, along with instructions to forward the invitation to other relevant experts in the topic, which is known as snowball or chain sampling (Patton, 2014).

Our demographic questions were optional, and data from participants who did answer the questions revealed our panel was geographically diverse, with a bias towards Western liberal democratic nations. Experts were from Australia (15), United Kingdom (7), United States of America (5), Belgium (3), Philippines (2), Poland (2), Bulgaria (1), Canada (1), Czech Republic (1), Germany (1), Italy (1), Netherlands (1), New Zealand (1), and Spain (1).

Our panel of experts represented a wide range of disciplines and professions. Academic experts (24) represented the disciplines of psychology (8), computer science (4), accounting (1), anthropology (1), international relations (2), information science (1), political science (1), philosophy (1), sociology (1), and behavioral science (1). Professional experts (20) represented non-profits (3), policy analysis (3), journalism (3), education (3), media (2), national security (2), chaplaincy (1), fact checking (1), public relations (1), and consultancy (1).

Appendix B: Materials

Our Phase 1 survey solicited responses (up to 5,350 characters) to the following targeted questions:

1. What are the most effective strategies or practices for combatting and/or building resilience to DMMI?
2. What are the important factors, challenges, or opportunities that impact combatting and building resilience to DMMI?
3. What are the most important areas/topics for future actionable research on DMMI?

Our Phase 3 survey was divided into four sections corresponding to the three Phase 1 questions and an additional section on definitions.

Section 1: Definitions review

In this section, we presented prospective definitions and asked participants to rate their agreement with each on a 5-point Likert scale. The definitions were:

1. Disinformation is deliberately false or misleading information. The intent may be to harm, coerce, exploit, deceive, etc.
2. Misinformation is false, misleading, or manipulated information but is shared with no intent to harm, deceive, exploit, coerce, etc.

Section 2: Effective strategies and barriers

Here experts were asked to complete two kinds of activities: 1) rate their agreement with the synthesis statements extracted from the Phase 1 survey using a 5-point Likert scale (*strongly disagree* to *strongly agree*) and 2) pick five synthesis statements and rank them according to some criteria.

We first asked experts to rate their agreement with the following synthesis statements describing effective strategies for combatting and/or building resilience to DMMI. After rating the statements, we asked participants to pick five which should be prioritized over the next five years and then rank those they selected in terms of priority.

1. Educating and raising awareness about the dangers of DMMI (especially in schools) is an effective strategy for combatting and/or building resilience to DMMI.
2. Establishing a robust regulatory framework for social media companies, overseen and enforced by a dedicated standards body that ensures transparency and accountability is an effective strategy for combatting and/or building resilience to DMMI.
3. Improving support and outreach to communities most affected by DMMI is an effective strategy for combatting and/or building resilience to DMMI.
4. Developing and implementing (improved) content accuracy and other “nutrition style” warning indicators for news sources is an effective strategy for combatting and/or building resilience to DMMI.
5. Improving media and information literacy in the population (including training in critical thinking, bias recognition, emotional intelligence, etc.) is an effective strategy for combatting and/or building resilience to DMMI.

6. Investing in and implementing automated/AI approaches and enhanced cybersecurity measures is an effective strategy for combatting and/or building resilience to DMMI.
7. Introducing (and enforcing) legislation that penalizes the deliberate spread of disinformation is an effective strategy for combatting and/or building resilience to it.
8. Publicly exposing details (e.g., funding sources, affiliations, geographic origins, etc.) about the most prolific sources of DMMI is an effective strategy for combatting and/or building resilience to it.
9. Fact checking/information campaigns, so long as they're engaging and transparent, are effective strategies for combatting and/or building resilience to DMMI.
10. Interventions on social/group dynamics that foster healthier interactions are effective strategies for combatting and/or building resilience to DMMI.
11. Interventions that curtail the financial rewards for spreading DMMI are effective strategies for combatting and/or building resilience to it.
12. Interventions that use popular media (films, T.V., podcasts, etc.) to combat and build resilience to DMMI are effective strategies for combatting and/or building resilience to DMMI.
13. Investment in research that improves our understanding of DMMI and evaluates the effectiveness of interventions against it is an effective strategy for combatting and/or building resilience to DMMI.
14. Prebunking/psychological inoculation (pre-emptively debunking anticipated disinformation) is an effective strategy for combatting and/or building resilience to DMMI.
15. Ensuring journalism meets the proper standards (especially for new journalism formats- podcasts, citizen journalism, etc.) is an effective strategy for combatting and/or building resilience to DMMI.
16. Improving journalist training is an effective strategy for combatting and/or building resilience to DMMI.
17. Increasing collaboration/coordination between sectors (academic, civil society, government, and private companies) is an effective strategy for combatting and/or building resilience to DMMI.
18. Increasing collaboration between states/nations is an effective strategy for combatting and/or building resilience to DMMI.
19. The "DISARM" model is an effective strategy for combatting and/or building resilience to DMMI.
20. The "RESIST" model is an effective strategy for combatting and/or building resilience to DMMI.

We then asked experts to rate their agreement with the following synthesis statements describing barriers that impact combatting and/or building resilience to DMMI. After rating the statements, we asked participants to pick five which were most impactful and then rank those they selected in terms of highest impact over the next five years.

1. Access to timely, factual information is a significant challenge to combatting or building resilience to DMMI.
2. Reliance on the "Information Deficit" model negatively impacts our ability to build resilience to or combat DMMI.
3. The Information Deficit model, while incomplete, contributes to a useful understanding of DMMI.
4. The relative shortage of quality journalism, coupled with the prevalence of DMMI in certain information spheres, significantly hinders our ability to build resilience against or effectively combat DMMI.
5. Cognitive or emotional biases/vulnerabilities have a significant impact on our ability to combat or build resilience to DMMI.
6. The growing gap between DMMI technologies and regulation/prevention is a significant challenge to combatting or building resilience to DMMI.

7. Inadequate understanding of the causes and effects of DMMI presents a significant challenge to building resilience to or combatting DMMI.
8. The lagging scientific understanding of DMMI impacts our ability to combat or build resilience to DMMI.
9. The lack of appreciation/understanding of the scope and scale of DMMI is a significant challenge to combatting or building resilience to DMMI.
10. Distrust in institutions and media significantly impacts combatting or building resilience to DMMI.
11. The lack of enforcement and penalties for creating or spreading DMMI significantly impacts our ability to build resilience to it.
12. The lack of political will to address the issue and support prevention efforts is a significant challenge to combatting and building resilience to DMMI.
13. Insufficient technical understanding of DMMI within politics is a significant challenge to combatting or building resilience to it.
14. A significant challenge to combatting and building resilience to DMMI is that the politicians capable of addressing the issue often traffic in it for their own benefit.
15. The current incentives (financial or otherwise) for creating or sharing DMMI are a significant challenge to building resilience to or combatting DMMI.
16. The improvements in and growing use of artificial intelligence is a major challenge to combatting or building resilience to DMMI.
17. The lack of engaging, tailored support for communities is a major challenge to combatting or building resilience to disinformation.
18. The relative inattention paid to non-English language DMMI significantly impacts our ability to combat or build resilience to DMMI.
19. Lack of engaging, quality education in media literacy/critical thinking is a major challenge to combatting or building resilience to DMMI.
20. The worsening political/ideological divide in society significantly impacts our ability to build resilience to or combat DMMI.
21. The increasing use of DMMI by malicious (state) actors presents a significant challenge to combatting or building resilience to DMMI.

Section 3: Prioritizing areas for future research

In the final section, we presented experts with the list below, containing all the areas for future research extracted from the Phase 1 survey. We then asked them to mark those which they thought should be prioritized over the next five years. Next, they were asked to rank all those they marked as a "priority" in terms of highest priority.

1. We need to better integrate field research/data with theoretical models of DMMI.
2. More research is needed on the link between DMMI and international crime.
3. We need more rigorous measures, metrics, and indicators for DMMI to build better situational awareness tools and early warning systems.
4. More research is needed to better understand how global threat actors use of DMMI
5. More research (and awareness) is needed relating to the ethical, moral, and philosophical/epistemological issues related to DMMI and associated issues.
6. This body of knowledge would need to be the product of a multi-disciplinary team of academics and professionals.
7. We need to better understand the transnational dynamics of DMMI and related issues (e.g., extremism).

8. We need to explore more whole of society (including Gov/Academic/Civil Society/Private sector collaborative) approaches to DMMI.
9. More research is needed on what kinds of platform-based interventions are best at combatting DMMI.
10. Research is needed to determine how to create accountability within the advertising and social media market to combat DMMI.
11. We need to develop measures and indicators of the overall "health" of an information environment/ecosystem that is independent of specific content.
12. Research is needed into what financial/economic incentives can be created/leveraged to make traditional and new/online media sources less likely to engage in, or be permissive to DMMI.
13. We need a body of knowledge for DMMI understood as a corpus of knowledge/concepts/practices, etc. related to countering and building DMMI.
14. We need more research on the role of narratives and discourse in both the spread of DMMI and combatting and building resilience to DMMI.
15. We need to explore and test ways to encourage/promote good journalism and positive relationships between trustworthy news organizations and platforms.
16. We need more research into the wide range and intersections between psychological, socio-cultural, and behavioral aspects of DMMI.
17. We need to better understand and design legal/regulatory/business model frameworks to improve the quality of the information environment while protecting civil liberties, including free speech.
18. We need research that investigates how to redesign advertising markets and advertising business models to combat DMMI.
19. Work is needed to understand what lessons from cyber security and other domains can be applied to the areas of DMMI, cognitive security, etc.
20. We need clearer taxonomy and commonly accepted definitions of terms, especially across disciplines/fields.
21. We need better research to understand the intersections of vulnerability and bigotry/prejudice/hate.
22. We need to explore and build international cooperation in combatting and building resilience to DMMI (international treaties, norms, information sharing, funding of interventions, etc.).
23. We need more research (and practical efforts) into legal, policy, and economic/financial means to hold social media companies as well as malevolent actors spreading DMMI accountable.
24. We need to design interventions and technologies that create positive affordances for civil discourse and support an open society while minimizing DMMI.
25. We need more rigorous measures, metrics, and indicators to gather evidence on the impact/influence of DMMI on individuals and groups in both the short term and long term and across a wide range and scale of systems (socio-cultural, political, economic, etc.).
26. Interventions need to be tested at the individual level (media literacy, critical thinking, inoculation, etc.) and at the systems level (public awareness/behavior change campaigns, K-12 education, and regulation).
27. We need to design and test/measure public awareness and behavior change interventions to counter disinformation and build resilience to disinformation.
28. Research is needed on how best to make AI more trustworthy and to prevent AI from being used to spread DMMI.
29. More research is needed to "follow the money" and understand how platform business models and relationships with content producers enable DMMI.
30. Research is needed to understand how AI (and related technologies) will be used by malign actors.

31. We need to better understand DMMI across a wide range of ethno-cultural, national, and linguistic groups.
32. We need to conduct research and interventions to test ways to improve algorithms and make them less likely to spread DMMI (these may include virality suppression/dampening, anti-polarization, radicalization interventions, etc.).
33. We need to research methods to (re)build trust in democratic institutions.
34. More research is needed on the information environment/ecosystem to understand the systems' "health," structure, dynamics, and evolution/behavior over time, at multiple levels (individual/groups) and over different time frames.
35. Research is needed on how best to leverage AI and AI/human teaming to detect, monitor, analyze, and combat DMMI.
36. More long-term research/evaluation is needed to understand what kinds of educational interventions (media literacy/critical thinking, combinations thereof, etc.) work best to counter and build resilience to DMMI.
37. Media literacy initiatives (especially in K-12) have been trialed and/or implemented in many countries. Research is needed to compare and evaluate these efforts and to establish international best practices in media literacy education as a tool to counter DMMI.
38. There is a need to develop methods to audit algorithms and accountability regulations to permit these audits.
39. Research and development is needed to produce better tools and techniques for detecting, verifying, tracking/monitoring, and attribution of DMMI.
40. More initiatives are needed to explore how platforms can team with academics, journalists, civil society organizations, and others to combat DMMI.
41. We need more research to understand the role of social media companies' algorithms in DMMI and ~~in~~ related phenomena (recommender systems, echo chambers, filter bubbles, polarization, and radicalization).
42. Research is needed to understand how and why different individuals and groups are vulnerable to DMMI and how best to build resilience in these groups.
43. More interdisciplinary research and collaboration is needed to address DMMI and understand why people believe and spread it.
44. Research is needed on emerging threats, including actors and technologies, and on the way DMMI may evolve in future.
45. Research is needed to understand how effective various media literary and critical thinking curricula and initiatives are, and how best to teach/improve media literacy and critical thinking in schools as well as to the general public.

Appendix C: Identifying and ranking effective strategies

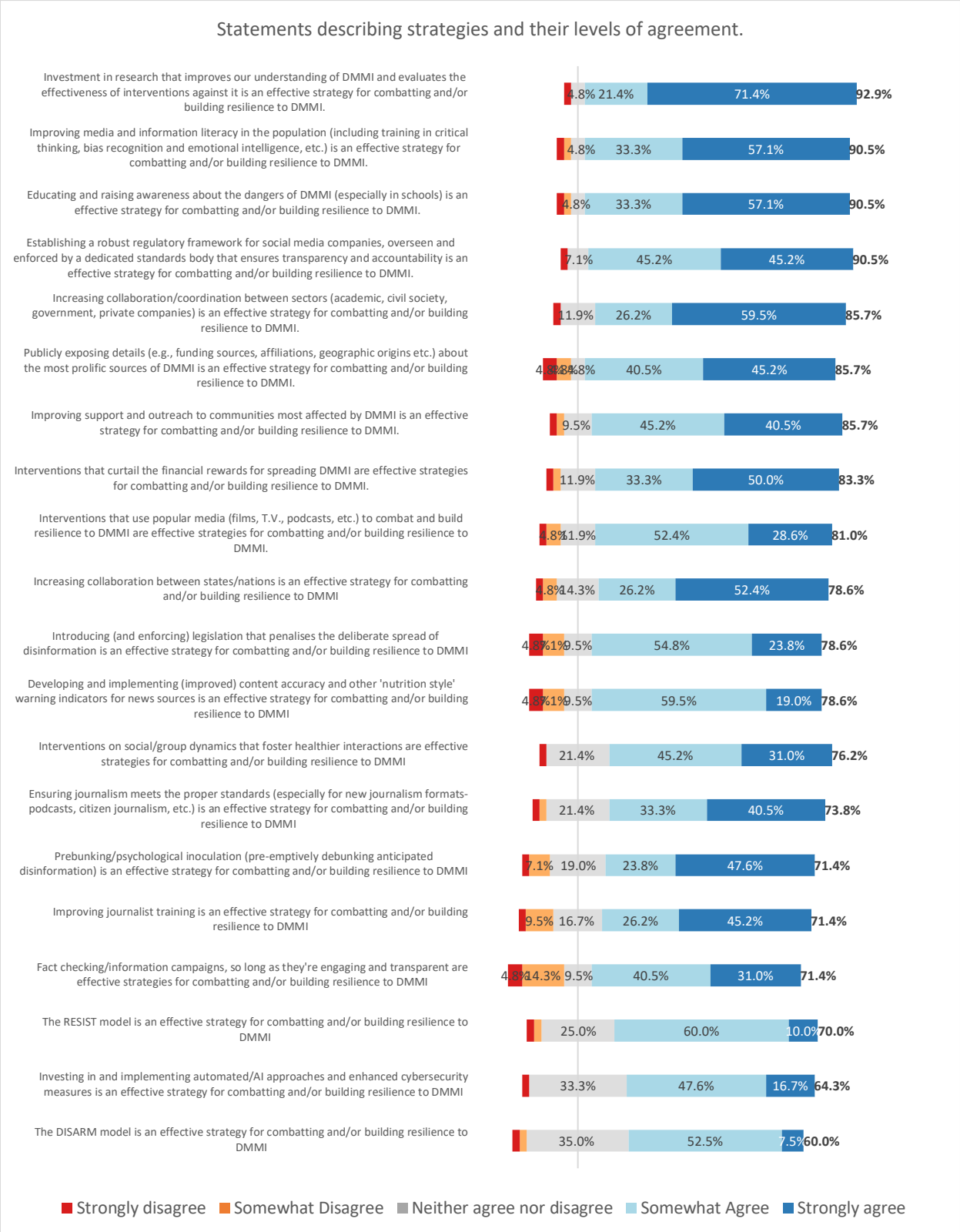

Figure C1. Expert panel agreement with synthesis statements describing effective strategies for combatting and/or building resilience to DMMI.

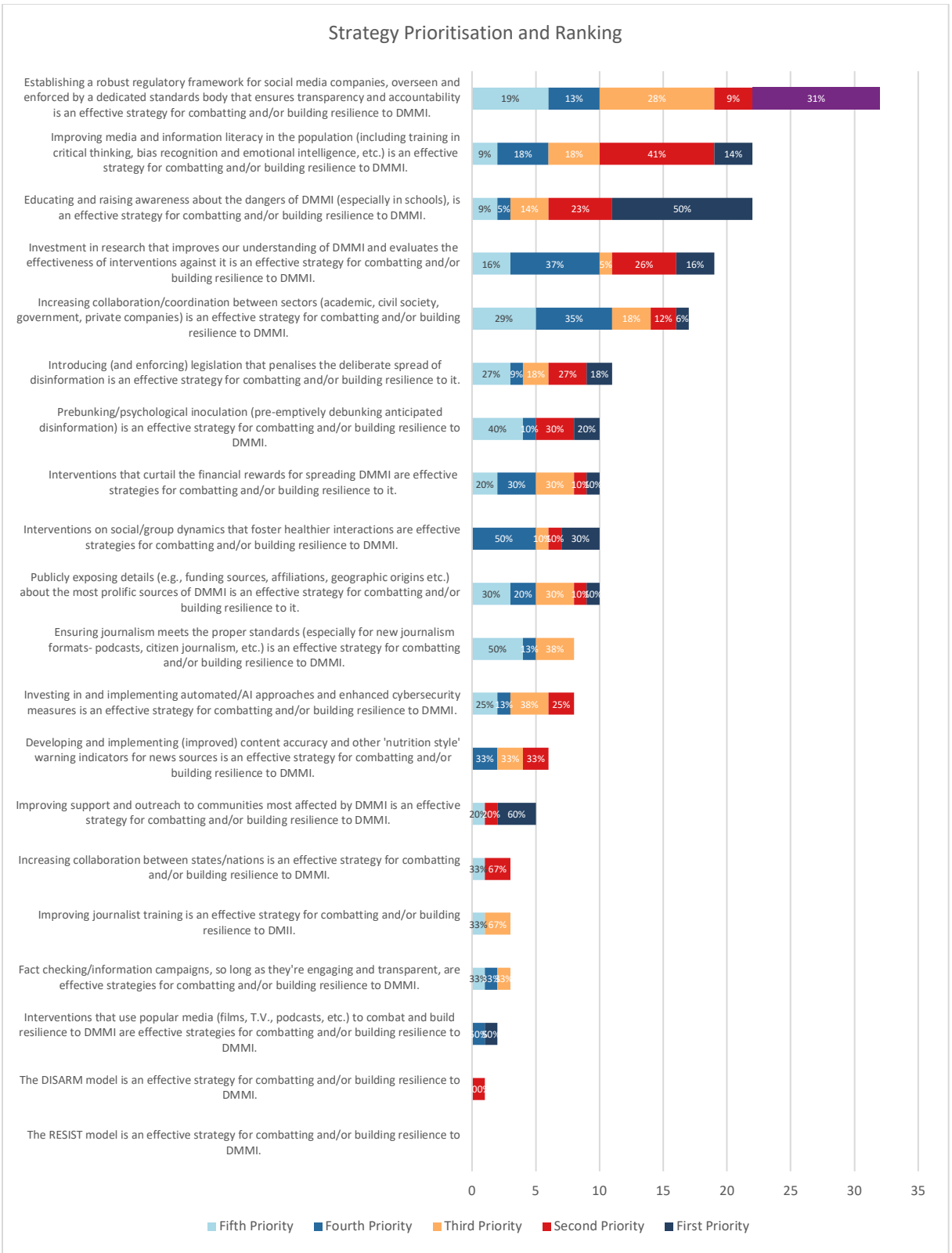

Figure C2. Results of the exercise where the expert panel was asked to select five strategies to prioritize over the next five years and then rank those selected in terms of the highest priority. *The length of each bar indicates how many times the strategy was selected as a priority and percentages indicate proportion of participants that ranked strategy as first, second, third, fourth, or fifth in terms of priority.*

Appendix D: Identifying and ranking barriers

Figure D1. Expert panel agreement with statements describing barriers that significantly impact combatting and/or building resilience to DMMI.

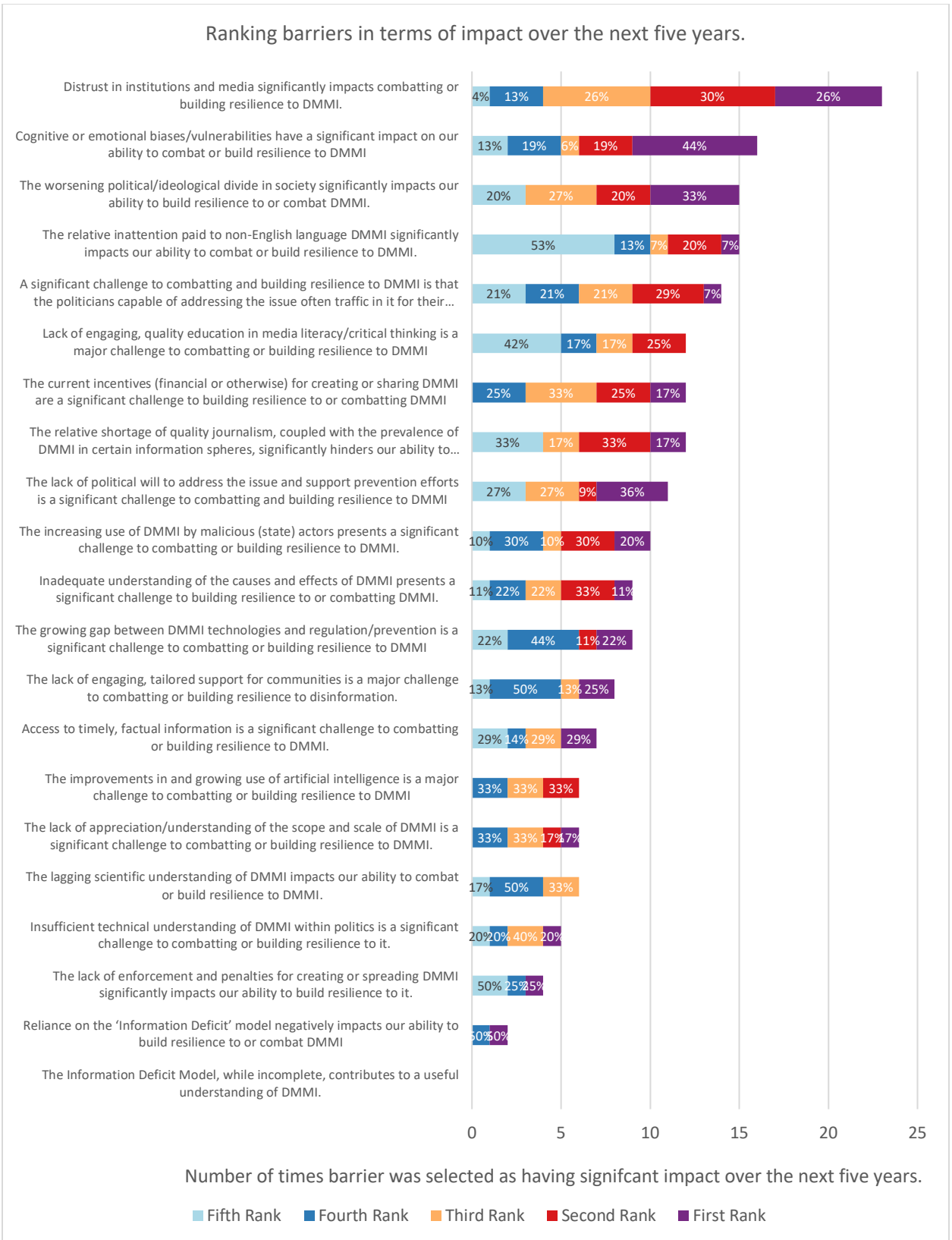

Figure D2. Results of the exercise where the expert panel was asked to select five barriers with the most impact and then rank those selected in terms of the highest impact.

Appendix E: Areas for future research to be prioritized over the next years

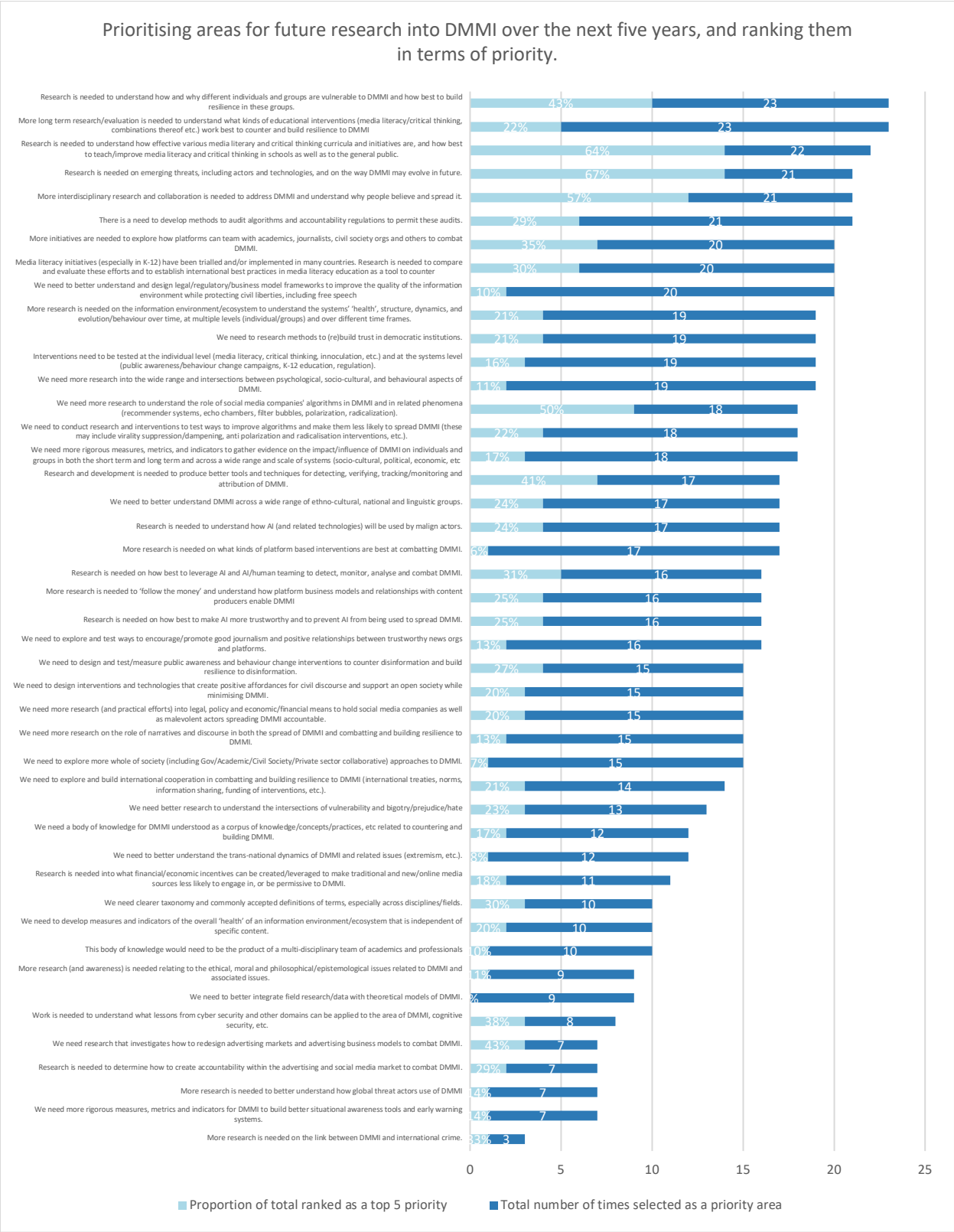

Figure E1. Results of the exercise where the expert panel was asked to select five areas for future research that should be prioritized over the next five years and then rank those in terms of the highest priority. *Each bar indicates the total number of times an area was selected as a priority as well as the percentage of the selections that were ranked as a top five priority.*