Supporting evidence-informed policy and scrutiny: a consultation of UK research professionals

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Abstract

Access to reliable and timely information ensures that decision-makers can operate effectively. The motivations and challenges of parliamentarians and policy-makers in accessing evidence have been well documented in the policy literature. However, there has been little focus on research-providers. Understanding both the demand- and the supply-side of research engagement is imperative to enhancing impactful interactions. Here, we examine the broader experiences, motivations and challenges of UK-based research professionals engaging with research-users relevant to policy-making and scrutiny in the UK using a nationwide online questionnaire. The context of the survey partly involved contributing to the UK Evidence Information Service, a proposed rapid match-making service to facilitate interaction between parliamentary arenas that use evidence and research-providers. Our findings reveal, at least for this sub-sample who responded, that there are gender-related differences in policy-related experience, motivations, incentives and challenges for research professionals to contribute to evidence-informed decision-making through initiatives such as the UK

Evidence Information Service. Men and women are equally likely to have policy experience; however, men report both significantly broader engagement with the research-users included in the survey and significantly higher levels of engagement with each research-user. Reported incentives for engagement included understanding what the evidence will be used for, guidance on style and content of contribution, and acknowledgement of contributions by the policymaker or elected official. Women were significantly more likely to select the guidance-related options. The main reported barrier was workload. We discuss how academia-policy engagement initiatives can best address these issues in ways that enhance the integration of research evidence with policy and practice across the UK.

Keywords:

evidence-informed decision-making, engagement, policy

Introduction

Decision-makers operate effectively when they have timely access to reliable information. The concept ‘evidence-informed policy’ initially gained recognition in the UK with the Labour Government from 1997 (e.g. [1]) and was linked to pressures for improved effectiveness and accountability [2]. Since then, the idea has broadened to incorporate a more complex understanding of how policy and evidence relate (for a fuller discussion of evidence-informed policy-making, please see [2,3]). More recent debates have focussed on research engagement to facilitate evidence-informed decision-making. For example, UK government departments now release details outlining their areas of research interest (ARIs) with the aim to ‘*align scientific and research evidence from academia with policy development and decision-making*’ [4]. This was in response to Sir Paul Nurse’s recommendation while reviewing the UK Research Councils to ‘*secure greater engagement*’ between policy-makers and researchers [5]. Additionally, the well-established UK Research Excellence Framework (REF) and the recently announced UK Knowledge Exchange Framework (KEF) provide a financial incentive for universities to demonstrate the impact of research findings [6,7]. Indeed, evidence suggests that the REF has contributed to a culture of wider engagement [8]. However, a recent and substantial study examining the role of research in the UK Parliament revealed that although research in its broadest sense is useful for parliamentary work, academic research is ‘*not cutting through*’ [9]. The study revealed that challenges to the use of academic research included lack of accessibility and poor communication [9], which mirrored findings from an earlier study of eight UK parliamentary staff [10]. Yet there remains a gap in knowledge regarding the challenges and motivations for research professionals to engage with evidence-informed policy-making processes. Understanding both the demand- and the supply-side of academic-policy engagement is essential for enhancing impactful interactions.

Although academic research is used by the UK Parliament, it is only one source of evidence – parliaments are interested in knowledge of all types [9]. As well as using diverse sources of evidence, there are also different parts of Parliament that use evidence and do so in diverging ways [10]. For

example, the UK Parliamentary Libraries provide research services to Members of Parliament (MPs) and Peers primarily through answering confidential inquiries or publishing briefing papers, whereas Committees scrutinise government policy through collating evidence and produce Committee reports with recommendations [11]. Accessing academic research also differs, with UK Parliamentary Libraries typically using journal subscriptions or known / established contacts rather than the more wide-ranging evidence calls for Committees. The research services at the devolved administrations in the UK operate under a slightly different structure. For example, the National Assembly for Wales Research Service provides the function of the Library by way of answering Assembly Member (AM) confidential inquiries and producing briefing papers, yet also supports the Assembly's Committees by assisting with research provision and the scrutiny of public policy [12]. Geddes et al. (2017) revealed that recognising these differences in evidence use, as well as understanding how Parliament works, is crucial for academics to effectively engage. This suggests that academics are required to provide different types of knowledge to the different parliamentary arenas that use evidence. Although this might indeed be a barrier to academic engagement, to date no study has surveyed the motivations and barriers for research professionals to engage with processes relating to policy-making and scrutiny.

Alongside the focus on research engagement there has been a rise in the number of knowledge mobiliser roles [13], for example knowledge brokers within universities [14] and Knowledge Exchange Fellows (e.g. [15]). These roles aim to translate knowledge into action to address the identified 'gap' between research and decision-makers [16–18]. Indeed, a large body of academic research has focussed on solutions to bridging this gap (e.g. [19–23]). However, much of this work has focussed on processes involving the Executive, with Parliament's policy influence only recently gaining increased recognition [24–26].

Even with this increased attention, challenges around using academic research in a parliamentary context remain. For example, the higher education sector is typically underrepresented in evidence

submissions to Select Committees and Public Bill Committees within the UK Parliament [9]. In part to address this, the Parliamentary Office for Science and Technology (POST) has developed an online hub for academic researchers to access guidance and information on providing evidence to parliamentary arenas. This is alongside the popular *Research, Impact and the UK Parliament* training workshops delivered at university campuses across the UK by the Universities Programme at the Houses of Parliament and POST [27]. Further studies on the supply-side of research engagement has been identified as ‘*instructive*’ by POST [9], indicating that exploring the academia side of engagement would be useful and informative. The devolved legislatures are also all developing their own academic engagement programmes.

This paper contributes to the researcher engagement debate by improving our understanding of the policy experience of UK-based researchers. Our research was conducted as part of a proposed initiative called the UK Evidence Information Service (EIS), an innovative model that aims to facilitate research engagement with decision-makers including parliamentarians [28]. The proposed EIS aims to act as a rapid matchmaker to connect the UK research community and decision-makers in the service of scrutiny and development of evidence-informed public policy. By matchmaking evidence-users with evidence-providers, the EIS should improve the communication and accessibility of research findings, addressing a key barrier to current evidence-informed decision-making processes [29,30]. A previous consultation of 56 UK parliamentarians revealed that 85% supported the EIS [28]. This consultation led to the EIS working with in-house parliamentary research services to explore potential pathways for information flow from the academic community to parliamentary arenas via supporting existing services. The EIS would complement and enhance the parliamentary research services that parliamentarians and their staff already utilise by providing rapid access to a wide network of academics. It is also proposed that as part of the EIS, contributing academics would be trained and briefed in parliamentary engagement.

In this paper we explore the broader experiences and motivations of an opportunistic sub-sample of UK-based researchers engaging with research users in the UK using a nationwide online questionnaire. This survey of the ‘supply-side’ of academic-policy engagement complements our ‘demand-side’ research comprising the previous consultation of UK Parliamentarians [28] and ongoing discussions with participating parliamentary research services. We also investigate what could encourage or pose a challenge to researchers engaging with academic-policy initiatives such as the EIS. We then examine how academic-policy initiatives such as the EIS might operate so to enhance research engagement. Although part of the survey questions were asked in the context of a proposed EIS system, the findings have a wider application to academic-policy engagement initiatives. For example, the results suggest features that would encourage academic participation if incorporated into an academic-policy framework.

Methods

1 Online questionnaire

Data were collected via an anonymous online questionnaire between 26 March 2017 and 25 January 2018. The survey was designed by the authors with input from the House of Commons Library and the National Assembly for Wales Research Service. Ethics approval for the survey was awarded by the School of Geography and Planning at Cardiff University on 06 March 2017. The questions aimed to gather information on the prior experience of academics contributing to material that politicians could use, including the nature of these interactions and the motivations to engage. The survey also collected data on future contributions, such as what would encourage or pose a challenge for academics to provide evidence as well as the logistics of an academic-policy framework. The full survey of 22 questions is included in Appendix, Table 1. The survey was generated using Qualtrics software [31].

The survey was circulated to 72 Universities / Research Institutes based in the UK. This was achieved through both publicly available email addresses (e.g. through Head of College / Faculty) and the University contact lists of the four UK legislative bodies (e.g. through Knowledge Exchange Officers). This ensured that the survey was circulated across the UK. Seventy-four (74) UK learned societies, one charity and one network (the latter two focussing on equality and diversity in higher education) were also sent the survey with a request to circulate to their members. The survey was also promoted on social media. It was requested that only UK-based academics and researchers complete the survey.

The survey was chosen to be distributed online as a cost-effect method of data gathering. However, there are biases within the data generated that must be considered when interpreting the results. For example, the data might not be representative as not everyone is able to access, use or respond to an online format. Additionally, as the respondents are a self-selecting group, it could be expected that the research professionals who chose to respond to the survey are more interested in policy and/or impact

of research. Although the data presented here adds a novel perspective to existing literature on academic engagement, it is unlikely to be representative of the UK academic population as a whole and therefore results must be interpreted with that caveat.

2 Statistics

All statistical analyses were conducted with R v 3.3.0 [32]. The analyses are explained in full below. Where possible, generalized linear models (as indicated by ‘GLM’) or generalized linear mixed effects model (as indicated by ‘GLMM’) were used. In these occasions, all models were checked for normality of residuals and homogeneity of variance. Statistical modelling utilized a stepwise model simplification approach. All fixed terms were fitted together and then the non-significant terms with the least explanatory power were sequentially removed. This occurred until a minimal adequate model was reached, retaining only those predictors whose removal now yielded a significant reduction in the explanatory power of the model. For GLMM, all random terms were retained in the model throughout. Statistical significance is reported from the calculations in the change in explanatory power on removal of that term from the model. Each model is explained in full below.

Career stage information provided by participants (see S1 Appendix for full list) was categorised by the authors into the three groups ‘early-’, ‘mid-’ and ‘senior-career’ and defined as follows. The category ‘early’ included those participants who identified as; PhD researcher, Research technician, Research assistant, MSc researcher. The category ‘mid’ included those participants who identified as; Lecturer, Research Fellow, Teaching Fellow, Post-doc position. The category ‘senior’ included those participants who identified as; Professor, Associate Professor, Senior Lecturer or Reader. The authors note that analyses involving career stage categorisations are indicative rather than conclusive as the distinction between roles can vary within and between universities. Inclusion of career stage in relevant models is explained in full below.

Academic discipline information provided by participants was categorised by authors using the Joint Academic Coding System (JACS) 3.0 principle subject codes. JACS is used and maintained by the Higher Education Statistics Agency (HESA) and the Universities and Colleges Admissions Service (UCAS) to classify academic subjects, with JACS 3.0 utilised since 2012/13. Using these JACS 3.0 codes, the responses were further categorised into ‘social sciences/art and humanities’ and ‘natural sciences’. Five responses were not possible to classify using JACS 3.0 and therefore were not included in any related analysis. Inclusion of science discipline in relevant models is explained in full below.

We were interested in exploring the effect of reported demographic factors on the survey results (see Results for full demographic breakdown of respondents). As we could not reliably analyse the effect of gender due to the sample size (see Results), we concentrated our analyses on gender where possible to add to the understanding of any gender-specific motivations and/or challenges to engage. We analysed for other demographic effects (e.g. career stage) where the sample size allowed.

The following three sub-sections detail the statistical analyses performed to generate the results as outlined in the Findings section.

2.1 Policy experience of a sub-sample of UK-based research professionals

First, we investigated the effect of gender on a participant reporting or not reporting (yes, no) a previous engagement with a source of material containing evidence that politicians could use (see Figure 3 and Appendix, Table 1 for list of options included in survey). This was achieved using a GLM with a binomial error distribution with the sole fixed effect of gender (woman, man). Second, we investigated whether gender influenced the number of reported non-zero previous engagements with a source of material containing evidence that politicians could use. A GLM with a binomial error distribution was employed as the response variable had a fixed maximum of 12 possible options. The

sole fixed effect was gender (woman, man). Third, we investigated the effect of gender on the number of reported previous engagements with a source of material containing evidence that politicians could use while controlling for the variation in reported engagement between the different sources. Participants were asked whether they had ‘contributed to’, been ‘approached by, but not contributed to’, ‘heard of only’ or ‘not heard of’ for each of the different sources of material containing evidence that politicians could use (see Figure 3 and Appendix, Table 1 for list of options included in survey). To obtain a reliable reflection of engagement levels, individuals who selected the response ‘not heard of’ for a given option were excluded, thereby providing an engagement level for research professionals who indicated they had at least heard of the option. A GLMM with the fixed effect of gender (woman, man), random effect of the different source and binomial error distribution was applied. Fourth, to investigate the effect of gender (woman, man) on (i) the nature of previous interactions, and (ii) motivations for previous interactions, a two-sample proportion test for equality without continuity correction was applied to each answer option. Fifth, to test whether reporting the provision of specific or general advice was related to gender (woman, man), a Chi-square test of independence was applied.

2.2 Future provision of evidence by a sub-sample of UK-based research professionals

First, to test whether having previous policy experience or gender influenced whether participants reported that they would like to take part in academic-policy initiatives such as the EIS, a GLM with a binomial error distribution was applied. The response variable only included the responses ‘Yes’ and ‘Maybe’ as there were too few ‘No’ responses to statistically analyse. The fixed effects were policy experience (yes, no) and gender (woman, man). Second, to test if there were differences in selecting ‘Yes’ or ‘Maybe’ between disciplines, a GLM with a binomial error distribution was applied with the sole fixed effect of science discipline (social sciences/arts and humanities, natural sciences). Third, to investigate the effect of (i) gender (woman, man), (ii) career stage (early, mid, senior; see above for definition) and (iii) science discipline (social sciences/arts and humanities, natural sciences) on what would encourage contributions to academic-policy initiatives, a two-sample proportion test for

equality without continuity correction was applied to each answer option. Fourth, to investigate the effect of (i) gender (woman, man) and (ii) career stage (early, mid, senior; see above for definition) on what would pose as challenges to contributing to academic-policy initiatives, a two-sample proportion test for equality without continuity correction was applied to each answer option.

2.3 Format of academic-policy initiatives

To investigate whether gender (woman, man) was independent of the reported importance of having contributions to academic-policy initiatives such as the EIS recognised, a Chi-square test of independence was applied.

Results

A total of 414 respondents initiated the survey, with 288 completing >50% of the questions and 154 completing all survey questions. The demographic of our participants was as follows (see Figure 1a-e). Gender information was provided by 269 individuals; 118 self-identified as female, 150 self-identified as male, 1 self-identified as other. Ethnic group information was provided by 245 individuals; 236 self-identified as 'White (British, Irish or other)' and nine self-identified as 'Asian or Asian British'. Age-bracket information was provided by 268 individuals, with six selecting '18-25', 69 selecting '26-35', 66 selecting '36-45', 68 selecting '46-55', 34 selecting '56-65' and 25 selecting '66+'. Location of work place was provided by 207 individuals, with 174 specifying England (50 based in London), 22 specifying Scotland and 11 specifying Wales. Six individuals specified a location of work place outside of the UK; however, as the invite requested that only UK-based research professionals completed the survey, it was assumed that these six individuals were based in the UK. For example, researchers can reside in different countries to their employers, be on long-term sabbatical leave, or have an honorary status with a University in a different country. Furthermore, five of the six individuals reported that they had at least heard of some of the UK policy-related options in the survey, with two individuals reporting previous engagement (see Question 2 in Appendix 1, Table 1 for list of options). The six individuals were therefore retained in the dataset with this assumption. Current career stage information was provided by 215 individuals; 23 were defined as early-career, 76 as mid-career, and 116 as senior-career (see Methods for definitions of career stage). Current science discipline information was provided by 267 individuals, with 262 classifiable using JACS 3.0; 102 were defined as 'social sciences/arts and humanities' and 160 defined as 'natural sciences' (see Methods for further details). All sample sizes are included with the relevant analysis below. NA responses were excluded in all analyses.

All data and analyses are publicly available via the Open Science Framework [33]. As detailed in the Methods section, we analysed the effect of demographic factors where the sample size allowed. The

statistical methods for the following three sub-sections are detailed in the corresponding Methods sub-sections.

Policy experience of a sub-sample of UK-based research professionals

Of 324 respondents, 314 felt that it was important for research to be considered during policy making. When asked about engaging with sources of material containing evidence that politicians could use (see Figure 3 and S1 Appendix for list of options included in survey), 165 ($n = 321$ respondents) reported they had engaged with at least one. There was no statistically significant effect of gender on whether a participant reported or did not report a previous engagement (GLM: $\chi^2_1 = 1.03$, $P > 0.05$; $n = 266$ individual respondents). The number of engagements with sources of material containing evidence that politicians could use ranged from zero to 12 out of a possible 12 options (median: 1). Looking at only those who reported one or more engagements, gender was statistically significant, with men reporting more engagement across the available options (GLM: $\chi^2_1 = 8.24$, $P < 0.01$; $n = 140$ individual respondents; median: 2; see Figure 2).

Respondents also reported a difference with what they had engaged with. To obtain a reliable reflection of engagement levels, only individuals who indicated they had at least heard of the option were included in the analysis (see Methods for full details). The greatest reported contributions were with printed / media content (114 of 295 individual respondents who had heard of the option), followed by the policy institute / department associated with their university (52 of 200 individual respondents who had heard of the option; see Figure 3.a). The number of individual respondents who had reported contributions and the number of individual respondents who had heard of the option(respectively) were as follows for the remaining options: Reviews of evidence from Government, 50 of 248; Reports from Think Tanks, 55 of 307; House of Commons Select Committee reports, 49 of 290; Government papers, 47 of 299; POST, 25 of 204; Scottish Parliament Information Centre (SPICe), 12 of 117; House of Lords Select Committee reports, 23 of 279; National Assembly

for Wales (NAfW) Research Service, 5 of 114; House of Commons Library, 9 of 235; Northern Ireland Assembly Research and Information Service (RaISe), 1 of 43 (see Figure 3.a). While controlling for the variation between the different options, it was found that men were significantly more likely to report an engagement across the different options (GLMM: $\chi^2_1 = 15.25$, $P < 0.001$; $n = 266$ individual respondents; see Figure 3.b).

Engaging with these sources of material containing evidence that politicians could use was mainly to provide general advice on the research topic ($n = 127$ of 187 respondents), although this was closely followed by talking about their own research projects ($n = 113$ of 187 respondents). Respondents also participated due to public engagement ($n = 98$ of 187 respondents) and being part of a research project specifically involving contribution to policy-making ($n = 60$ of 187 respondents). Men were more likely to report providing general advice than women ($\chi^2_1 = 4.01$, $P < 0.05$; $n = 158$ individual respondents), but equally likely in all other three options ($\chi^2_1 < 1.66$, $P > 0.05$ for all). Examples specified under the 'Other' option (12 individual respondents) included several references to both government/ and parliamentary process, such as: *participated in a House of Commons roundtable discussion; membership of Defra Evidence groups; invited to present at the Speakers House in Westminster*. Contributing to policy-making tended to be specifically within the academic's research field ($n = 111$ of 188 respondents), rather than partially ($n = 69$ of 188 respondents) or not related ($n = 8$ of 188 respondents). Gender was not significantly associated with these options ($\chi^2_2 = 3.73$, $P > 0.05$; $n = 161$ individual respondents). For participants who had been involved in providing evidence for policy-making in the past, the primary motivations for engaging were for interest ($n = 138$ of 205 respondents) and as a sense of duty as a publicly-funded researcher ($n = 123$ of 205 respondents; see Figure 4). Men were more likely than women to report that a sense of duty as a motivation for providing evidence ($\chi^2_1 = 7.66$, $P < 0.01$), with no significant gender differences found in the remaining options ($\chi^2_1 < 1.81$, $P > 0.05$ for all; $n = 175$ individual respondents).

Future provision of evidence by a sub-sample of UK-based research professionals

The EIS aims to create an efficient and effective communication channel between research-producers and research-users in the service of evidence-informed decision-making [28]. The EIS is a potential way of matching academics with Parliamentary staff who need swift access to evidence and knowledge to support their work for politicians and Committees. It may also have wider applications to other groups of people who would gain a benefit from academic advice. The survey tested academic interest in engaging with such a model. Of 285 respondents, 211 stated that they would in principle like to take part in such a rapid response model as the EIS, with a further 69 selecting the 'Maybe' option. Having previous policy experience was not significantly related to whether participants selected 'Yes' or 'Maybe' (GLM: $\chi^2_1 = 0.0084$, $P > 0.05$), but gender did have a marginally significant effect with men more likely to select 'Yes' (GLM: $\chi^2_1 = 3.94$, $P < 0.05$; $n = 260$ individual respondents). There was no significant difference between disciplines in selecting 'Yes' or 'Maybe' (GLM: $\chi^2_1 = 0.18$, $P > 0.05$).

For a rapid response academic-policy model such as the EIS to succeed, research professionals would also need to respond to requests for evidence provision in a short timescale. A combined 278 of 291 respondents stated that they would be prepared to spend time at short notice to respond to research questions in their area of specialism. This was broken down as a quick telephone call / email being the marginally more popular option to provide evidence ($n = 231$ of 291 respondents), relative to a lengthier telephone call / email ($n = 209$ of 291 respondents) and contributing to a policy briefing ($n = 208$ of 291 respondents). Participants were asked to state their likelihood of providing a response to a request for evidence within certain deadlines (see Figure 5 a-c for full list of choices). A quick response was very likely from two days onwards ($n = 144$ of 276 respondents), whereas a lengthier response was only very likely to be provided from one week onwards ($n = 139$ of 279 respondents). Contribution to a policy briefing was very likely from two weeks onwards ($n = 141$ of 276 respondents).

Participants were also asked what would encourage them to contribute to the EIS. The most common selection was to understand what the advice will be used for (224 of 287 respondents). Seven of the remaining eight possible choices were similar in response rate, which included acknowledgement of contribution(s) from policymaker/elected official ($n = 182$), guidance on style ($n = 153$) and content ($n = 161$) of contribution, public recognition of contribution(s) ($n = 155$) and REF-related recognition of contributions ($n = 148$; see Figure 6). Women were significantly more likely than men to select the options relating to guidance (style: $\chi^2_1 = 12.84$, $P < 0.001$; content: $\chi^2_1 = 15.81$, $P < 0.001$; $n = 267$ individual respondents), with the remaining options not significantly different between the genders ($\chi^2_1 < 2.18$, $P > 0.05$ for all). There was a significant difference between career stages selecting that acknowledgement of contributions(s) from line manager/university would encourage them to engage, with participants who were defined as ‘early-career’ selecting the least often and ‘mid-career’ the most often (see Methods for definitions of career stage; $\chi^2_2 = 11.30$, $P < 0.01$; $n = 210$ individual respondents). The remaining options were not significantly different between defined career stages ($\chi^2_2 < 3.90$, $P > 0.05$ for all). Respondents from a social sciences/arts and humanities discipline were significantly more likely than natural sciences to select public ($\chi^2_1 = 7.97$, $P < 0.05$) and REF-related ($\chi^2_1 = 8.53$, $P < 0.05$; $n = 255$ individual respondents) recognition as ways to encourage engagement. The remaining options were not significantly different between defined science disciplines ($\chi^2_1 < 5.48$, $P > 0.05$ for all). Of the information provided in ‘Other’ ($n = 40$), several participants responded within the broader theme of feeling that they are making a difference. For example:

“Actually being listened to and being able to make the world a better place”

“Responsibility as a publicly funded scientist to support societal progress”

“Sense of knowing that I had a useful contribution = that could make a difference”

“Seeing it put into practice for greater good.”

A second theme that emerged was receiving feedback on the use of advice provided, for example:

“Being informed of the outcome and feedback on usefulness”

“That contribution leads to evidence based policy making”

“Confidence regarding how the advice will be used”

“Feedback on how the advice was actually used / what the impact was”

“Likelihood of effective use of advice”

The most prominent challenge to contributing to the EIS as identified by the participants is schedule (212 of 281 respondents). This was followed by lack of transparency for what the advice would be used for (149 of 281 respondents), lack of previous experience working with policymakers ($n = 125$) and lack of guidance on content of contributions ($n = 120$; see Figure 7). Women were marginally significantly more likely than men to select concerns about confidentiality ($\chi^2_1 = 4.06$, $P < 0.05$) as challenges to engaging with a system such as the EIS, while men were significantly more likely than women to select personal motivation ($\chi^2_1 = 4.49$, $P < 0.05$; $n = 260$ individual respondents). All other remaining options were not significantly different between the genders ($\chi^2_1 < 3.36$, $P > 0.05$ for all). Participants who were defined as ‘senior-career’ identified self-confidence less often than those defined as ‘early-career’ or ‘mid-career’ as a challenge to engaging (see Methods for definitions of career stage; $\chi^2_2 = 9.87$, $P < 0.01$; $n = 211$ individual respondents). ‘Early-career’ participants were less likely to select schedule as a challenge than those classified as ‘mid-career’ or ‘senior-career’ ($\chi^2_2 = 12.99$, $P < 0.01$). The remaining options were not significantly different between defined career stages ($\chi^2_2 < 3.63$, $P > 0.05$ for all). Respondents from a social sciences/arts and humanities discipline were significantly more likely than natural sciences to select lack of recognition ($\chi^2_1 = 6.47$, $P < 0.05$) and lack of reward ($\chi^2_1 = 5.22$, $P < 0.05$; $n = 251$ individual respondents) for contributions as challenges to engagement. Those with a natural science discipline were more likely than social sciences/arts and humanities to select lack of experience as a challenge to engaging ($\chi^2_1 = 11.55$, $P < 0.001$). The remaining options were not significantly different between defined science disciplines (χ^2_1

< 2.37, $P > 0.05$ for all). Examples specified under the 'Other' option ($n = 21$) included reference to the respondents' view that evidence can be politicised:

"Policymakers do not want to hear about evidence that does not confirm their view of the world or political position"

"End use of advice unacceptable"

"Very likely that in my fields [...] my contribution would be ignored. But it is important to get some research into the public record nevertheless"

"Having done it - recognition that comments only 'used' if seen as politically/ideologically relevant."

Format of academic-policy initiatives

Respondents indicated preference for research or advice provided to an academic-policy initiative such as the EIS to be publicly available (236 of 285 individual respondents). With regards to anonymity, not knowing the identity of the end-user of the research provided to policy-making would only prevent 21 participants (of 283 respondents) from contributing, and 176 participants (of 284 individual respondents) would prefer to be identifiable themselves to the end-user. Respondents would prefer to be initially contacted about providing evidence for academic-policy initiatives via e-mail ($n = 269$ of 279 respondents) rather than telephone ($n = 9$ of 279 respondents) or an App. interface ($n = 1$ of 279 respondents). 107 of 285 individuals stated that it would be 'somewhat important' to have their contributions recognised, followed by the options of 'important' ($n = 93$), 'very important' ($n = 57$) and 'not at all important' ($n = 28$). Gender was independent of this choice ($\chi^2_3 = 2.15$, $P > 0.05$; $n = 264$ individual respondents).

Figure 1. Self-reported demographic information of participants. **A.** Gender ($n = 268$ individual respondents). **B.** Ethnic group ($n = 245$ individual respondents). **C.** Age bracket (years; $n = 268$ individual respondents). **D.** Location of work ($n = 207$ individual respondents). **E.** Career stage (see Methods for definitions; $n = 215$ individual respondents).

Figure 2. The number of previous engagements with sources of material containing evidence that politicians could use as reported by women and men (see Figure 3 for list of options included in survey). The graph represents density, median and quartiles for responses by participants, and is derived from 140 individual respondents that provided gender information. Dots represent outliers.

	Journalists for printed/online articles	Policy institute/department associated with the University	Reports from Think Tanks	Reviews of evidence from Government	Government papers	House of Lords Select Committee reports	House of Commons Select Committee reports	RaISe	SPICe	NAW Research Service	House of Commons Library	POST
Number of respondents who selected 'not heard of'	23	112	10	64	18	35	24	155	193	197	81	106
Total number of respondents who answered the question	318	312	317	312	317	314	314	188	310	311	316	310

Figure 3.a. The proportion of participants that had at least heard of the option that reported previous engagement. Number of individual respondents who had at least heard of the option indicated in the y-axis. The table indicates for each option (i) the number of respondents who reported they had not heard of the option, and (ii) the total number of individual respondents who answered the question. Abbreviations: RaISe, Northern Ireland Assembly Research and Information Service; SPICe, Scottish Parliament Information Centre; NAWRS, National Assembly for Wales; POST, Parliamentary Office of Science and Technology.

Figure 3.b. The proportion of participants that had at least heard of the option that reported previous engagement while also providing gender information. Number of individual respondents who had at least heard of the option per gender indicated on the graph. Men were significantly more likely to report

engagement. Abbreviations: RaISe, Northern Ireland Assembly Research and Information Service; SPICe, Scottish Parliament Information Centre; NAfW, National Assembly for Wales; POST, Parliamentary Office of Science and Technology.

Figure 4. The reported motivations for providing evidence for policy-making ($n = 205$ individual respondents). Looking at those responses where gender information was also provided, men were significantly more likely to select sense of duty than women ($n = 175$ individual respondents).

Figure 5. Reported likelihoods of providing evidence to certain outputs within specified timeframes. Participants could select a likelihood category for each specified timeframe. The line graphs depict the timeframe in which a response becomes 'very likely', as indicated by the solid line in each graph. **A.** A quick response ($n = 276$ individual respondents). **B.** A lengthier response ($n = 279$ individual respondents). **C.** A briefing paper ($n = 276$ individual respondents).

Figure 6. The reported encouragements for contributing to an academic-policy initiative such as the EIS ($n = 287$ individual respondents). Looking at those responses where gender information was also provided, women were significantly more likely to select the two guidance-related options than men ($n = 267$ individual respondents). Looking at those responses where career information was also provided, 'early-career' were significantly more likely and 'mid-

career' least likely to select acknowledgement of contributions(s) from line manager/university (see Methods for definitions of career stage; $n = 210$ individual respondents). Looking at those responses where science discipline information was also provided, 'social sciences/arts and humanities' were significantly more likely to select the public and REF-related recognition options ($n = 255$ individual respondents).

Figure 7. The reported challenges for contributing to an academic-policy initiative such as the EIS ($n = 281$ individual respondents). Looking at those responses where gender information was also provided ($n = 260$ individual respondents), (i) women were significantly more likely to select concerns regarding confidentiality, and (ii) men were significantly more likely to select personal motivation. Looking at those responses where career information was also provided, 'senior-career' were significantly more likely to select schedule and least likely to select self-confidence than 'early-career' or 'mid-career' (see Methods for definitions of career stage; $n = 211$ individual respondents). Looking at those responses where science discipline information was also

provided ($n = 251$ individual respondents), ‘social sciences/arts and humanities’ were significantly (i) more likely to select the recognition and reward options, and (ii) less likely to select previous experience

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Discussion

We used a nationwide online questionnaire to investigate the policy experience of UK-based researchers to better understand the ‘supply-side’ of the academia-policy engagement relationship. Our main findings, for our survey respondents at least, reveal first there are gender-related differences in policy-related experience, as well as motivations and challenges for UK research professionals to contribute to evidence-informed decision-making through initiatives such as the EIS. Second, that understanding what the advice would be used for is a key incentive for academic engagement. Third, that schedule is the main reported barrier to providing research evidence. Fourth, the survey revealed that participants showed strong support for a system such as the proposed EIS that matches expertise with need. Finally, our results indicated that research findings would be provided within short timescales in response to requests for evidence by decision-makers. We discuss the wider implications of these outcomes from our survey respondents for academia-policy engagement initiatives.

Our findings highlight the wider incentives for research professionals to engage with decision-makers. Participants who had previously provided evidence for policy-making reported interest and a sense of duty as publicly funded researchers as key motivators to engaging. This signals a baseline willingness in the academic community to engage with decision-makers, at least within this self-selecting sample. As for encouraging future contributions, participants primarily wanted to understand what the advice would be used for. Two other important key factors in encouraging research professionals to engage with academic-policy initiatives such as the EIS were to have their contributions acknowledged by a policy-maker / elected official, and to have guidance on how to provide content of contribution. Women were particularly likely to choose the latter, alongside guidance on style of contribution. Acknowledgement of contribution(s) from a line manager / university was more important for early-career researchers (as defined by this study; see Methods for classification). This may simply be as a result of the academic employment structure, where those defined as early-career are more likely to have supervisors or Principle Investigators rather than be independent researchers. Indeed,

acknowledgement from universities might also be perceived to help with career progression at this stage.

Our findings also highlight the wider challenges for research professionals to engage with decision-makers, providing clear guidance on how to improve wider policy engagement with academics. Despite the reported importance for research to be considered during policy-making, only around half of the participants had engaged with a source of material containing evidence that politicians could use. A key challenge for research professionals to contribute is schedule, with participants defined as senior-career researchers (see Methods for classification) more likely to select this option. For REF2014, 20% of impact case studies outlined engagement with the UK Parliament [34]: if universities want to increase this type of engagement, the major barrier of academic workload will require addressing. Corresponding with the top motivator to contribute, a second key challenge was a lack of transparency of what the advice would be used for. Interestingly, lack of previous experience working with policymakers was also reported as a challenge to contributing; however, our results show that a lack of previous policy-related experience would not hinder future participation in academic-policy initiatives such as the EIS.

Combined, these identified challenges and incentives suggest that any academic-policy engagement initiative requires three key features from the academic community's perspective. First, guidance should be provided for academics tailored to the different opportunities to submit research evidence. Our findings suggest that this may particularly encourage women to engage. Providing guidance might also mediate the finding that a lack of previous experience working with policy-makers poses a challenge to contributing, despite the fact that lack of actual experience did not affect reported inclination to participate in an academic-policy initiative such as the EIS. Second, how and why the submitted research evidence will subsequently be used should be made transparent. This may be dealt with at least in part by raising awareness of the differences between policy-related processes, for

example policy-making by the Government / Executive or policy scrutiny by Parliament. Third, and related, initiatives should provide clear acknowledgement of the research contribution by academic sources. This last point in particular may have important beneficial implications for REF impact case studies. REF2014 required that there was a direct link from impact case studies to research outputs [8]. Due to the nature of parliamentary scrutiny and policy-making, it is often difficult to pinpoint the influence of one study. Additionally, this requirement to link impact case studies with research outputs potentially excluded impact generated via policy advice [8]. It is possible that future REF and/or KEF iterations may allow for channels involving the provision of policy advice from a wider base of research to be submitted as impact case studies. If academic-policy initiatives are able to provide such clear acknowledgement of research contributions, the cost of preparing impact case studies for submission to REF could conceivably be reduced. In 2014, this was estimated to be £55m and borne by the Higher Education community [8].

The General Election of 2017 delivered the most diverse UK Parliament yet, with a rise in the number of women, LGBT and ethnic minority MPs [35]. However, less is known about the diversity of people who engage with the different parliamentary sites that use research evidence across the UK legislative bodies. Submitting evidence either orally or in writing to a Select Committee is currently one of the key mechanisms for researchers to engage. In 2013-14, only 26.2% of oral evidence was presented by women within the higher education sector to UK Parliament Select Committees [36]. This was marginally higher than the overall gender balance, where 24.6% of oral evidence was given by women in the same study [36]. Similarly for the National Assembly for Wales, it was found that only 27% of external non-elected participants were women in Committee meetings across a twelve-year period [37]. Our results correspond with this low gender diversity, with men more likely to report being asked for general advice and also contributing to a larger number of sources of evidence available to decision-makers. For UK Parliamentary Select Committees, gender diversity data of witnesses has been systematically collected since the publication of a number of recommendations for a more representative and inclusive House of Commons in 2016 [38]. The overall gender diversity of

witnesses increased in the 2016-2017 Session to 28.5% women presenting evidence [39]. The UK Parliament is committed to working with a diverse range of people, looking broader than just gender diversity ([40]; the devolved administrations also have diversity action plans, see [41–43]). For example, the Universities Programme at the Houses of Parliament recently launched an online survey to identify the barriers for typically under-represented groups to engaging with Parliament for academics [40]. Although our survey could only reliably analyse one facet of diversity – gender – the findings can contribute to this wider intelligence gathering. For academia-policy initiatives to engage women, programmes need to address concerns about confidentiality and offer guidance on both style and content of contribution. Understanding and incorporating these gender-related differences in incentives and challenges to engaging with policy-making processes could improve the gender diversity of those who contribute. Expansion of gender diversity in the response base could conceivably increase the quality of evidence by providing broader perspectives and ideologies on research topics [44].

Participants indicated strong support for a system such as the proposed EIS that matches expertise with need. For a rapid response academic-policy model to succeed, research professionals would also need to provide evidence within the short timeframes typical of parliamentary research units and / or decision-makers. This would certainly complement the rapid response parliamentarians indicated they would want to receive information [28]. Our findings suggest that, for our sub-sample at least, UK-based research professionals would be likely to work in a quick turnover capacity, for example providing a quick answer within two days and a lengthier contribution from one week. A key part of establishing the feasibility of such an academic-policy initiative is to test this indication in practice. The EIS project team is working with the House of Commons Library and the Research Service at the National Assembly for Wales to trial academic participation in ‘test’ parliamentary service outputs within short timeframes. For example, trials have included reviewing current briefing papers to indicate recent research updates and collating reading lists for future committee briefings. Future work could evaluate the added-value of academic contributions to the parliamentary research services

within such timeframes. Additionally, this study only explored the supply-side of a potential academic-policy initiative. Although previous research with UK MPs indicated support for a rapid response system such as the EIS [28], in practice evidence provision is likely to be via existing parliamentary research services as suggested by the parliamentarians themselves. It is therefore important to ascertain the demand by parliamentary research services for academic-policy initiatives such as the EIS. Further research on this particular ‘demand-side’ would be informative for developing effective academic-policy initiatives.

Limitations

Despite the extent to which the survey was circulated, the uptake was not as high as expected. This could potentially be due to two reasons. First, it may be that only a small number of research professionals received the survey. The survey was primarily disseminated to learned societies and professional services roles (such as Impact Managers, Head of Colleges) with a request to circulate to staff or society members. Instead of facilitating uptake this could potentially have acted as a barrier if the ‘gate-keeper’ decided not to circulate. Linked to this, the dissemination of the survey beyond the initial contact could not be monitored, so the full reach of (or lack of) the survey could not be assessed. Second, it may be that only a small number of research professionals are interested in research-policy initiatives. This could conceivably limit the success of research-policy initiatives such as the EIS. However, tailoring research-policy initiatives to include the recommendations from this study may provide the incentives for more research professionals to be actively involved. A second study limitation was the method of delivery. Although online surveys provide a cost-effective method for data gathering, the results are not typically representative of the population as a whole and results should therefore be interpreted with this caveat. For example, the results presented here might only be true of research professionals who are already interested in research-policy initiatives. While this may provide evidence on barriers and challenges of those research professionals with experience or knowledge of engaging (which is valuable data for improving such systems), it may not represent academics in other circumstances. A third study limitation was the lack of participant diversity. The

reported demographic information revealed that although gender and age of participants were fairly balanced, diversity in both location of work and ethnic group were low. This may signal that the channels of communication used had biases within them, the phrasing of the survey invite was not perceived as inclusive, or a combination of these or other factors. As the majority of participants reported their place of work as England (outside London), and a majority reported their ethnic group as White, our findings may not be representative for the full diversity of UK-based research professionals. With this in mind, it would be beneficial for future work to invite representatives from minority backgrounds to be a part of the study design to ensure a breadth in participation.

Future for the proposed EIS system

Although the survey findings have a wider application to academic-policy engagement initiatives, part of the survey questions were asked in the context of a proposed EIS system. As mentioned previously, the EIS is an innovative engagement model that aims to facilitate connections between decision-makers such as parliamentarians and the research community [28]. The proposed EIS model would implement our research findings and those of other key studies, with the aim to improve how evidence is integrated with policy and practice across the UK. The EIS would provide a fairer platform for researchers regardless of geographic location relative to the legislative/government body or previous policy experience, and for civil servants and parliamentary staff regardless of science background or length of post within a specific policy theme. It would also facilitate interactions based on subject expertise rather than how well-known the academic is. Alongside this, the EIS would provide the infrastructure to monitor and evaluate evidence use in decision-making, providing feedback and analysis on research engagement. This would ensure that EIS is a truly iterative system that can feed into larger evaluation frameworks such as the UK REF or the proposed KEF. To date, the service design incorporates feedback from research users, such as parliamentarians, parliamentary research staff and civil servants, and research providers, such as academics, professional service staff and learned society staff. This has ensured that the EIS is an evidence-based solution for academic engagement across the UK. The next steps for the EIS is to trial mechanisms for engagement and

evaluate the impact of such research engagement, as well as continue to consult with relevant stakeholders.

Conclusion

To conclude, as with our initial consultations with UK parliamentarians [28], we have found a strong appetite within our sub-sample of UK-based research professionals for a system such as the EIS to facilitate connections with decision-makers. Given that many participants had not previously engaged with policy-making yet indicated that it was important for research to be considered, this represents an untapped resource for UK academia-policy initiatives. Key considerations for encouraging diversity and breadth of academic engagement with decision-makers are to; (i) provide tailored guidance, (ii) acknowledge contributions, and (iii) ensure transparency for what the submitted evidence will subsequently be used for. The authors note that the third point may be addressed at least in part by raising the awareness of the different policy-related processes, for example Parliament versus the Executive. Policy-academic evidence-based engagement is a two-way, iterative process with benefits to both sides. While understanding the motivations of parliamentarians and policy-makers in accessing the best available evidence has been well-documented in the policy literature (e.g. the Executive: [45]; Parliament: [28]) by understanding the motivations and challenges also currently facing research professionals in engaging with such decision-makers, more iterative policy-academic initiatives (like the EIS) could enhance the integration of research evidence with policy and practice across the UK, and even internationally in other similarly democratic political systems.

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