

Reducing air travel emissions in academia: an exploration of universities' manoeuvring room

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Abstract

Purpose – This paper aims to explore the manoeuvring room of higher education institutions to take action to reduce emissions from academic flying. In particular, this study investigates how university staff and central actors in university management evaluate potential measures in this area.

Design/methodology/approach – The authors applied a single case study design encompassing an online survey directed at staff ($N = 338$) and 11 semi-structured interviews with key actors from management at an Austrian university. The authors used descriptive statistics and qualitative content analysis to examine the data.

Findings – This study found considerable support among university staff in principle for implementing measures to reduce academic flying, but also serious concerns about the fairness and viability of some restrictive measures, especially disincentives and caps on flying. However, bans on short-haul flights were largely supported. Actors from university management saw their manoeuvring room limited by the potential resistance and non-compliance of staff, as well as by framework conditions external to the university.

Practical implications – Dedicated leadership is needed to facilitate broad commitment within the university and to avoid shifting the responsibility between different governance levels. Restrictive measures to reduce academic air travel will be more readily accepted if perceived as fair and viable.

Originality/value – Although several papers have addressed the behavioural and institutional factors that sustain extensive flying in academia, to the best of the authors' knowledge, this is one of the first contributions to investigate the potentials and challenges of introducing measures to reduce air travel in higher education institutions.

Keywords Academic air travel, Carbon lock-in, Carbon-neutral university, Climate change mitigation

Paper type Research paper

1. Introduction

As early as the 1970s, higher education institutions began to address sustainable development in terms of research and teaching and to engage in “greening” their campuses. These efforts have now been mainstreamed at many places (Leal Filho *et al.*, 2018;



Udas *et al.*, 2018). More recently, climate change mitigation has entered the spotlight with the call for “carbon neutral universities” (Udas *et al.*, 2018). Relevant greenhouse gas emissions are typically distinguished according to their source. While emissions on campus (scope 1) and from purchased energy (scope 2) can readily be calculated and have already been addressed in many ways, indirect emissions (scope 3) such as those from business travel are often not systematically accounted for Valls-Val and Bovea (2021). This is problematic, seeing business travel and especially air travel emissions account for a significant share of university emissions (Ciers *et al.*, 2019; Arsenault *et al.*, 2019). Comprehensive policies at the institutional level are needed to enable academics to reduce their travel emissions and to remove structural barriers (Nursesey-Bray *et al.*, 2019; Kreil and Stauffacher, 2021). This also requires deep and systemic changes at the organisational level (Leal Filho *et al.*, 2018), especially if the scale of desired behaviour change is fundamental (Thaller *et al.*, 2021b).

Academia’s heavy reliance on air travel is indeed increasingly being challenged. Initiatives have formed collecting individual pledges to fly less or to abstain from short-distance flights (Scientists for Future Austria, 2022; Scientists for Future Germany, 2019; NoFlyClimateSci, 2017). Approaching the matter from a broader perspective, the “slow scholarship” movement opposes individualised performance metrics that incentivise long-distance travel and calls for a stronger regional engagement of academics (Glover *et al.*, 2018; Hartman and Darab, 2012). Furthermore, a small but rapidly increasing number of universities is making attempts to reduce emissions from air travel undertaken by their staff, and a broad range of measures has been put forward to serve this purpose (Kreil and Stauffacher, 2021). Common measures tend to avoid penalising or restricting flying. While some universities only use carbon offsetting, others actively incentivise alternatives to air travel by intensifying technical support and training for videoconferencing (VC), providing state-of-the-art software for VC, giving recommendations on sustainable travel and the use of VC, providing guidelines on how to travel sustainably and covering costs for premium rail tickets for long train journeys (Ahonen *et al.*, 2021; Hoolohan *et al.*, 2021; Kreil and Stauffacher, 2021; Glover *et al.*, 2018; Getzinger, 2020; Schmidt, 2022). Furthermore, most institutions taking steps to reduce air travel emissions are monitoring their air travel emissions and many have defined reduction targets (Kreil and Stauffacher, 2021). However, some universities have also started to ban flying under certain conditions (Hoolohan *et al.*, 2021). Additionally, university-internal levies on flying are introduced, the returns of which are earmarked for funding further climate measures (Krams, 2022; Getzinger, 2020).

Nevertheless, research on the challenges of implementing such counteracting measures is still very limited. Considering the comparatively low amount of attention air travel has received in terms of sustainability policies at universities, this study explores how university staff and key actors in university management at an Austrian university evaluate potential policies to reduce academic air travel emissions [1]. Applying the concept of carbon lock-in, we explored the preparedness to reduce academic flying and surveyed how the university’s manoeuvring room was assessed. By examining how a range of potential measures are evaluated in terms of their effectiveness and implementability, we also explored what concerns are voiced in relation to these. We addressed two main research questions:

- RQ1. How do staff and central actors in university management evaluate potential measures to reduce university emissions from air travel?
- RQ2. How do these actors assess their manoeuvring room, and what responsibilities do they assign to the university and different actors within the university?

In section 2 the concept of carbon lock-in is introduced and previous research that has identified challenges towards reducing academic air travel is reviewed. The methods applied in our study are discussed in Section 3, and the results are presented in Section 4. Results are discussed in Section 5, followed by a conclusion in Section 6.

2. Academic flying as carbon lock-in

In this paper, we understand academic air travel as all air trips undertaken by university employees for professional purposes. The significant extent of academic flying can be seen as a case of carbon lock-in. The concept was first introduced by [Unruh \(2000\)](#), who understood it as interdependent technological, institutional and social forces that inhibit effective climate mitigation policies. While Unruh mostly focused on technological systems and their co-evolution with institutions, more recent authors have also paid attention to the aspect of behaviour ([Seto et al., 2016](#)). Behavioural lock-in is considered to include emission-intensive habits or social practices, often reinforced by certain identities and social norms ([Seto et al., 2016](#); [Trencher et al., 2020](#)). Together with technological and institutional factors, this can explain why even people with strong environmental values engage in carbon-intensive practices.

Indeed, [Lassen \(2010\)](#) found that the staff at two Danish knowledge organisations displayed high levels of awareness, but routinely side-lined their environmental concerns in relation to business air travel. Recent research findings confirm this attitude-behaviour gap among academics: Concerns over career progression make researchers engage in frequent air travel, in spite of their concerns about climate change ([Nursey-Bray et al., 2019](#)). [Whitmarsh et al. \(2020\)](#) found that providing researchers with information about the environmental impacts of air travel only resulted in *intentions* to fly less, but that actual flying behaviour was strongly shaped by social and structural factors, such as geographic location and family commitments. These inconsistencies between environmental values and extensive air travel can produce tensions and various rationalisation- and coping-strategies among researchers, in particular among those working on sustainability ([Schrems and Upham, 2020](#)).

A range of behavioural and institutional factors have already been described that contribute to this lock-in. At the behavioural level, [Gärdebo et al. \(2017\)](#) reflected on academic air travel as a shared practice and habit among researchers, stating that these practices are reinforced by deeply rooted collective identities, as researchers have already understood themselves as travellers for centuries. Similarly, [Parker and Weik \(2013\)](#) argued that longstanding conceptions of intellectuals as “free spirits” have contributed to high mobility expectations in academia. A role identity as a “successful academic” thus facilitates extensive travel and easily prevails over competing identities related to green behaviour ([Nursey-Bray et al., 2019](#)).

Interacting with and reinforcing such behavioural lock-in factors are institutional factors that facilitate extensive air travel in academia. For one thing, academic reward systems typically encourage extensive international travel ([Nursey-Bray et al., 2019](#)). Apart from the immediate benefits of networking at international meetings and conferences, international travel also functions as a marker of excellence. Having studied or worked at renowned research institutes abroad and having a track record of presentations at international conferences can be critical when applying for open positions and research grants ([Parker and Weik, 2013](#)). This is in spite of the fact that academic productivity has been found to be unrelated to researchers’ air travel emissions ([Wynes et al., 2019](#)). Furthermore, not only individuals but also universities are evaluated in terms of their international presence and reputation ([Hoolohan et al., 2021](#)). This has prompted universities to develop internationalisation agendas and to promote international travel among their staff ([Hopkins et al., 2016](#); [Glover et al., 2017](#)). With air travel as the taken-for-granted way of travelling ([Høyer and Naess, 2001](#)) and university travel guidelines addressing mode choice only in

terms of costs (Hopkins *et al.*, 2016), such internationalisation efforts translate into the promotion of extensive air travel.

3. Methods

To answer our research questions, we applied a single case-study design, focusing on the University of Graz, Austria. A mixed-methods design was used, including an online survey directed at all staff members, and semi-structured interviews with key actors in university management to collect data on the views of the different types of actors and to enhance research credibility. Data were evaluated using descriptive statistics and qualitative content analysis, in line with the explorative nature of our research questions (Creswell, 2014).

The survey (directed at academic and administrative staff) was accessible from August to September 2020. Two invitations to participate were sent out via e-mail to all staff members with a regular employment contract [2]. For developing the survey, we reviewed collections of potential measures to reduce flying in the university context (Neier, 2020; Kreil, 2019) and selected 18 potential measures broadly covering the following areas:

- monitoring and information;
- decision aids;
- VC improvements;
- support for booking ground-based trips;
- extended cost coverage for rail travel;
- carbon offsetting;
- disincentives for air travel;
- conditions to air travel; and
- limits to air travel.

To address research question (1), respondents were asked to indicate the extent to which they would support or reject the measures on a scale ranging from 1 (“I would strongly disapprove”) to 4 (“I would very much welcome”). To address research question (2), we asked to what extent they were in principle prepared to reduce their own business air travel and how they would rate the importance that universities take steps to reduce air travel emissions for climate protection reasons, again from 1 (“Not important”) to 4 (“Very important”). Furthermore, several questions included the option to add open comments in a textbox. Finally, we collected sociodemographic data, in particular concerning staff type (predoc researchers/postdoc researchers and lecturers/professors/administrative staff). Further questions on travel behaviour and travel decision factors were evaluated in a separate study (Thaller *et al.*, 2021b). The survey was completed by 355 staff members, but we excluded those with an incorrect answer to the control question, leaving a final sample size of $n = 338$ (267 academic and 71 administrative staff, response rate 11.5%). Descriptive statistics were subsequently used to present the participants’ evaluation of different measures using the R software (version 1.2.1335). Furthermore, open comments were coded in MAXQDA (version 2018), focusing on the participants’ concerns with respect to potential measures and their assessment of different actors’ capacities and responsibilities to contribute to reductions in academic flying.

From December 2020 to March 2021, 11 semi-structured interviews (40–60 min each) were conducted with key actors in university management. Interviewees were selected based on their central involvement in general university management (members of the rectorate, (vice-)deans, employees’ council) or their key role in the university’s

environmental, travel-related and performance-related management. Due to the COVID-19 pandemic, interviews were conducted as online videocalls. To address research question (1), interviewees were asked to rate both the effectiveness (high/medium/low) and implementability (easy/medium/difficult) of measures that had already been presented to the university staff in the survey, with the addition of a reduction target for air travel. The measures were combined into groups for reasons of practicality (see list above). Furthermore, interviewees were also asked to share their general opinions on the measures. To address research question (2), further questions covered the (potential) process of implementing measures to reduce air travel emissions. Ten interviews were recorded and transcribed, and one interview was only summarised, as the interviewee did not consent to a recording. The transcripts and the summary were coded in MAXQDA, and the code outputs subsequently summarised. Credibility was ensured by interviewing actors from a range of different positions and by analyst triangulation.

4. Results

In the following sections, results from the survey (subsection 4.1) and from semi-structured interviews (subsection 4.2) are presented. Descriptive statistics at the beginning of each section provide an overview the evaluation of measures. Subsequently, each section provides qualitative results on central concerns of the respective actor group. Coding tables for qualitative results are provided in the supplementary material (Tables A2 and A3).

4.1 Evaluation of measures by university staff

In our survey, respondents expressed considerable support for the idea that measures should be taken by universities to reduce air travel emissions (51% considering it very important and 32% important). In open comments, several staff members noted that universities should act as role models and lead by example in reducing air travel emissions. Reference was made to the special responsibility of universities as public bodies and as organisations with a profound understanding of the threats posed by climate change:

The university has in-depth knowledge of the damage caused by emissions from air travel and thus has a social responsibility to build a working model for employees that other companies can follow.

Some respondents, however, called for individual autonomy in travel decisions and opposed any prescriptions by the university. One previous question concerning the preparedness of staff to reduce their business air travel triggered arguments in the opposite direction: Here, some respondents noted that reducing air travel in academia at the individual level is challenging, as international travel is crucial for career development, and choosing to fly less thus constitutes a competitive disadvantage for researchers. Therefore, they saw the university as filling an important role in defining travel guidelines, assigning funds to green travel options and adjusting performance indicators:

Please do not patronise academic staff in their choice of transport. Anything else impairs freedom of teaching and research!

The uni[versity] needs to take responsibility, and assign more funds to green travel. This responsibility cannot be simply pushed onto the staff.

However, these opposing views partly converge in their support for or at least tolerance of university *incentives* for green travel as opposed to restrictive or prescriptive measures.

Indeed, asked to what extent they would welcome or disapprove of specific measures, respondents tended to favour measures that incentivise and enable alternatives over flying restrictions. Support was highest for measures extending cost coverage for rail travel and for improvements in the university's infrastructure for video-/teleconferencing (90%–96% approval, i.e. “rather welcome” or “very much welcome”, see [Figure 1](#) and statistical aggregate Table A1 in supplementary material). In contrast, measures that either limit or disincentivise air travel were disapproved of by the majority of respondents. Interestingly, disincentivising air travel by penalising departments for it financially (34%–38% approval) was rejected more strongly than introducing absolute caps on flights or emissions (41%–48% approval). Furthermore, limiting the carbon travel-budget of a department (41% approval) was evaluated less favourably than limiting the number of flights per person (48% approval). Perhaps surprisingly, the rejection of restrictive measures to curtail air travel did not extend to denying approval of short-haul connecting flights, if a rail connection were available at the required time (e.g. Vienna-Graz, 73% approval). The proposition not to refund costs for flights if the destination could be reached by train within a certain time (e.g. 8 h) was also approved of by a majority of respondents (54%). The open comments, however, showed that the respondents had some reservations concerning the longer travel times and the lack of appropriate train connections. In terms of carbon offsetting, voluntary offsetting was more readily accepted than an obligatory scheme. Some respondents noted that air travel by university staff should be effectively reduced rather than merely offsetting emissions, while others noted concerns that carbon offsetting would mainly serve to silence the traveller's conscience and thus incentivise further air travel. Remarkably, rejection rates of measures that restrict flying or prescribe alternatives were consistently lower among predoc researchers ($n = 78$), compared to the overall sample. This effect was particularly pronounced for per-person limits on air travel, which received 64% approval from predocs.

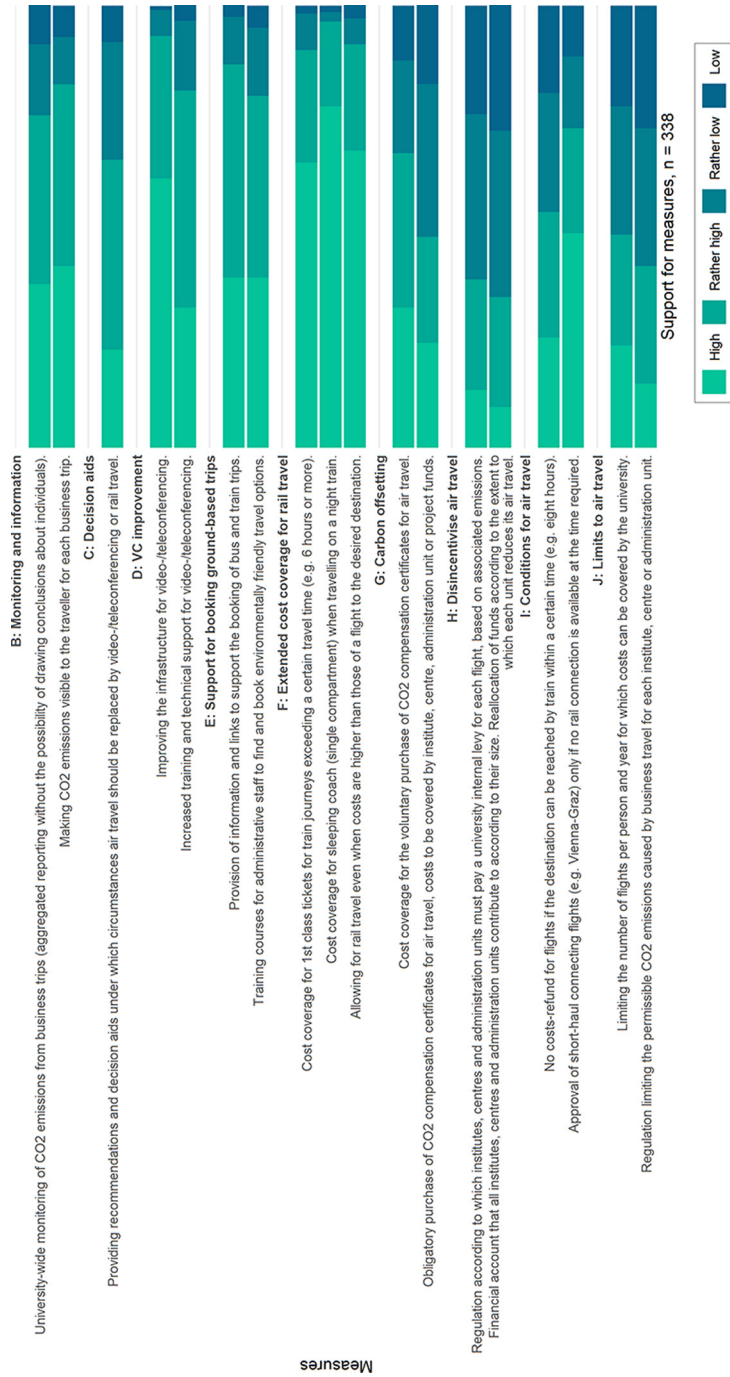
In open comments, survey respondents mentioned a number of concerns, cutting across the range of potential measures. These mainly addressed the limited availability and adequacy of alternatives, as well as fairness concerns. We take these points in turn. First, several respondents argued that extensive air travel is a sheer necessity in academia and that the potential for universities to reduce it is highly limited:

As long as conferences are taking place all over the world and international partners are spread all over the world, I do not see how universities can impact air travel in a positive manner.

A large number of respondents also questioned the adequacy of alternatives to air travel for their trips. In terms of mode change, in particular the replacement of flights by train journeys, respondents mainly expressed concerns concerning travel time and comfort. University staff clearly have widely divergent views regarding what can be reasonably expected from them in terms of the duration of train journeys. Part of this divergence may be explained by the difficulties some respondents faced to reconcile longer travel times with personal obligations (especially child care) or professional commitments, e.g. teaching.

In terms of travel comfort, several respondents lamented the lack of appropriate train connections, frequent changeovers and departures or arrivals at inconvenient times. Some also noted that they could not sleep well on a night train or found it difficult to work while travelling. Furthermore, some respondents had safety concerns in relation to night trains, and mobility-impaired people noted that train journeys could be extremely challenging for them, especially if this involved several changeovers. Many respondents also had serious reservations concerning the substitution of air travel with VC. The main point made by a large number of people is that the adequacy of VC as an alternative strongly depends on the

Figure 1.
Evaluation of
measures by
university staff
(n = 338)



type of event. A widely shared position is that VC can work well for practical meetings, but that it is a poor substitute for conferences.

A major concern expressed in relation to measures that limit or disincentivise air travel is the potentially unfair distribution of available resources both *within* and *between* departments and the conflicts that may ensue. Firstly, several respondents pointed out that different research areas require different amounts of international travel, both in terms of the number of trips and the distances covered. Distributing carbon travel budgets to departments according to their size or simply permitting a certain number of flights per person and year would thus penalise more globally connected disciplines. A bonus/malus system according to the extent of the air travel reduction relative to a baseline could avoid this, but some respondents problematised the fact that this approach penalises those that have flown little in the past. Secondly, a significant number of respondents raised concerns that defining limits or introducing financial disincentives at the level of departments would result in professors and other senior researchers using up the largest share of available resources. This would make international travel difficult for young researchers who are, at the same time, most dependent on it for their career development:

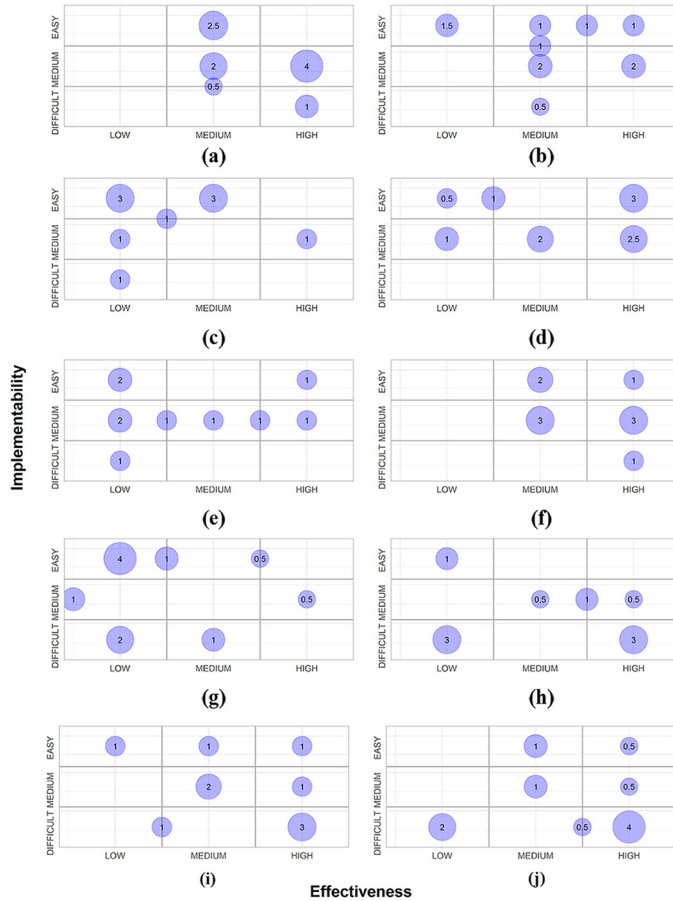
[I see the] risk that people in higher, better positions within the unit would be privileged in terms of flights, while already more precarious staff or especially younger scientists would probably get fewer opportunities.

4.2 Evaluation of measures and potential implementation process by key actors

In general, the actors we interviewed assessed measures to reduce emissions from the university's air travel in similar ways as the staff did in our survey. In particular, measures that enable alternatives (extended cost coverage for rail travel, VC improvements) were evaluated rather favourably in terms of their effectiveness and implementability (see [Figure 2](#)). The same held true for a reduction target and measures designed to monitor and inform staff on their travel emissions. Some scepticism was expressed regarding the effectiveness of decision aides as well as of providing support for booking ground-based trips. Similarly, the effectiveness of carbon-offsetting measures was strongly questioned. Finally, interviewees expressed serious reservations with respect to the implementability of measures that define conditions for air travel and even more reservations regarding measures that limit or disincentivise it. Furthermore, central concerns mentioned by university staff in our survey were also shared by interviewees.

In addition to these concerns, interviewees reflected on various points concerning a university's manoeuvring room in implementing measures to reduce air travel emissions. Central points included staff resistance to measures, appropriate governance levels and the relevance of external actors. Some interviewees argued that restrictive measures are not well aligned to the organisational culture of a university. For one thing, they pointed out that budgetary sanctions are rarely used as governance tools within the university and thus do not fit in well. More importantly, a number of interviewees argued that it is difficult to enforce measures that are opposed by university staff, as compliance with the rules strongly depends on their acceptance:

We are not, let's not confuse this, a company [. . .] where there is clearly an ownership structure and the owner then says, I want this to happen. And if it doesn't happen, then you're out of the game. [. . .] So I think the difficulty would be that it simply isn't accepted and people just do it the way they do it. (senior university administrator, male).



Notes: (a) Reduction target; (b) monitoring and information; (c) decision acids; (d) vc improvement; (e) support for booking ground-based trips; (f) extended cost coverage for rail travel; (g) carbon offsetting; (h) disincentivise airtravel; (i) condition for airtravel; (j) limits to air travel. Figures in the circles indicate the number of interviewees who placed a group of measures in a certain field. Interviewees could also place a group of measures at the border between different fields. In some cases, interviewees wished to differentiate between two different measures within a group or two variants of a single measure and place them in different fields; in this case, a 0.5 value was used to count each of the two placements. Out of 11 interviewees, 1 interviewee wanted to only comment qualitatively on the measures without placing them in the matrix, thus $n = 10$ for this form of assessment. Furthermore, one interviewee refused to place measure group H (disincentivise air travel) in the matrix, being fundamentally opposed to it, thus $n = 9$ for this group of measures

Figure 2. Assessment of the effectiveness (low/medium/high) and implementability (difficult/medium/easy) of groups of measures by key actors from university management

Indeed, strong concerns were expressed about a lack of acceptance and active resistance to measures that limit, conditionalize or penalise air travel of university staff. Interviewees noted that such measures could lead to open controversy and eventually backfire on efforts to reduce air travel emissions. Against this background, some interviewees questioned the manoeuvring room that university management really has to curtail air travel:

What I cannot yet assess is how sensitive this topic actually is in the university, how much room for manoeuvre there really is for university management. [...] [It] will be important to sound out how far the staff is willing to go along with something like this. (member of rectorate, male).

Most interviewees, therefore, argued for working mainly or exclusively with measures that raise awareness and enable or incentivise alternatives to air travel (e.g. monitoring emissions and extended funds for green travel).

The issue of organisational culture and potential resistance to measures relates to the question which governance level is appropriate for taking steps to reduce travel emissions. Widespread agreement was observed among our interviewees that at least a basic framework needs to be defined top-down by the rectorate. Such a framework would serve to define goals, create commitment, raise awareness, provide necessary funds, and, as some advocated, define carbon budgets for schools or departments. However, several interviewees argued that the selection of specific measures should be left to schools and departments. Their point is that such a bottom-up approach could consider the diverse needs of different scientific communities. Some hopes were also expressed that such tailor-made solutions would be conducive to the acceptance of measures to reduce air travel:

Top down, of course, a certain budget must be provided, i.e. this must be on the agenda of the rectorate in terms of awareness raising and enabling things. [...] [But] I believe that very intelligent mechanisms can also be created at a university in a decentralised way, and that different policies are needed for each school. (senior university administrator, male).

In contrast, other interviewees warned that such an approach would lead to confusion and discriminatory treatment of people from different organisational units and would shift the responsibility for implementing measures over and down to deans and department heads, where resources to engage with this topic are limited:

The school as such does not have enough capacity to chase after departments to implement goals like that. (vice dean, male).

[Autonomy] always sounds good in theory, but [...] often too much autonomy is not really desired, and then again so many different solutions are found that you end up with problems of inequality between the schools again. (vice dean, female).

Indeed, a tendency to allocate responsibility to other actors' governance levels was observed in our interviewee sample. While representatives of central university management tended to favour autonomy for schools and departments in defining specific measures, (vice)deans and the employees' council tended to call for universal rules that would apply to all organisational units.

Finally, interviewees frequently referred to the relevance of external actors. Interestingly, shifting responsibility to others was discussed rather critically regarding carbon offsetting for air travel. Several interviewees argued that the university should not outsource its responsibility to reduce travel emissions in this way:

You should not offer [offsetting] for things that can actually be reduced net. And thereby create the impression that you are approaching zero [emissions], but in reality, with certificate trading in the background, you have simply shifted the problem to somewhere else. (senior university administrator, male).

Nevertheless, interviewees also pointed towards further actors to successfully reduce air travel emissions. For one thing, some interviewees pointed out the need to alter contracts with the responsible Austrian Federal Ministry that specify the purposes for which universities can use their funds, mainly encompassing research and education. Serious concerns were expressed that spending significant funds on climate protection, therefore, could be challenged by the audit court, e.g. in the case of extended cost coverage for rail travel. In addition, they noted that the Ministry does not value online participation in conferences in the same way as physical participation in the university's performance record. Furthermore, several interviewees also pointed out the lack of appropriate train connections as well as poor information and booking services for cross-border train journeys. They indicated that railway companies had a duty to improve their services or identified a need for EU legislation to mandate improved services. Finally, some interviewees argued that it would be difficult for a single university to reduce their travel emissions, as this would hamper its research performance and set it at a competitive disadvantage.

5. Discussion

We identified a number of measures to reduce business air travel of university staff and explored how such measures are evaluated by university actors. Our survey results indicate broad support from university staff for the introduction of measures to reduce business air travel in general. The results suggest that tackling this issue would be well received by most university staff. At least some of the fears expressed by key actors in university management concerning widespread resistance to such measures thus appear unwarranted. Our results, however, also confirm the findings of earlier studies (Lassen, 2010; Nursey-Bray *et al.*, 2019; Whitmarsh *et al.*, 2020; Schrems and Upham, 2020), which reveal a value-action gap among university staff concerning a reduction in their business air travel. While the importance of such a reduction was acknowledged, respondents faced difficulties applying it and had serious reservations in relation to restrictive measures. We thus face a typical lock-in situation, where willingness to change does not suffice for actual change due to a variety of socio-technical barriers.

Both university staff and key actors in university management displayed a clear preference for incentivising alternatives to air travel over restrictive or prescriptive measures. Such reservations towards restrictive measures are, in fact, consistent with findings from research on the general acceptance of sustainable transport policies (Thaller *et al.*, 2021a; Eriksson *et al.*, 2008). Nevertheless, lock-in situations are hard to overcome with voluntary change and typically require more stringent interventions (Unruh, 2002). In this context it is important to note that the acceptance of measures among staff not only depends on the level of coercion used, but also on their perceived fairness. Thus, per-person limits on air travel were not rejected as strongly as limits for organisational units and were even approved of by almost two thirds of predoc researchers. Fears existed that departmental flight budgets would be unfairly distributed and it appears that many respondents, especially junior researchers, considered per-person limits to be a fairer approach. The higher rejection rates observed for financial disincentives for flying as compared to the rejection rates for absolute limits may be another indicator of fairness concerns, as penalising international travel appears to be unfair. Thus, caps on flights or travel emissions may be more readily accepted in analogy to budgetary limits. Apart from fairness, the viability of alternatives emerged as another strong factor that influences the acceptability of restrictive measures, as evidenced by the relatively high approval rate for banning or not refunding flights that could be substituted by train journeys with a reasonable effort. Similar results underlining the importance of restrictive measures for reducing academic flying being perceived as fair, effective and viable were recently reported by Kreil and Stauffacher (2021). Fairness and viability

of alternatives thus constitute key criteria for designing acceptable restrictive measures, which will be crucial for overcoming the lock-in situation.

A central topic that emerged in this study was the question of how responsibilities for action are assigned – in other words, which actors are responsible for addressing lock-in. Most staff considered it important that universities introduce measures to reduce air travel, and several respondents argued that universities have a special responsibility to take action in this area. Furthermore, several staff members and key actors also viewed carbon offsetting for air travel rather critically, arguing that responsibility for emission reductions should not be pushed off onto others. However, in terms of the distribution of responsibility among actors at the university, we observed a tension between the desire to retain control over travel-related decisions and a reluctance to take on the burden of responsibility to take action.

At the level of individual staff members, some were opposed to prescriptions in terms of mode choice or a more restrictive travel regime. Nevertheless, as other respondents noted, expecting air travel reductions in academia to be implemented at the individual level on a voluntary basis is problematic, as choosing to fly less under the current framework conditions can put people at a competitive disadvantage. This does not necessarily indicate that individual pledges to fly less or to abstain from flying altogether are unrealistic or ineffective. Indeed, as *Attari et al. (2019)* have shown, individuals that have reduced their own carbon footprint find it easier to convince others to do so and more readily mobilise support for climate mitigation policies. In our case, for example, distinguished senior researchers that choose to fly less, may serve as role models for others and build broader support for measures to reduce academic flying. A key point, in line with our understanding of frequent flying in academia as a case of carbon lock-in, is that systemic change is necessary to enable individuals in academia to fly less (*Whitmarsh et al., 2020; Nursey-Bray et al., 2019; Thaller et al., 2021b*). Yet, this systemic change may be pushed forward by the embedded agency of committed and resourceful individuals (*Garud et al., 2007*).

At the level of the university, the question of responsibility was often related to one of two contradictory principles: tailoring policies to the needs of different departments and schools and the non-discriminatory treatment of staff. Interestingly, we identified a certain tendency among interviewees to assign responsibility for implementing specific measures to other actors' domains, e.g. deans tended to call for university-wide measures and members of the rectorate tended to favour that differentiated measures be applied by the schools. These observed tendencies suggest that key university actors are somewhat reluctant to implement potentially unpopular measures to reduce air travel, which may make them lean towards assigning responsibility to others. Highlighting the agency of others while downplaying one's own, a recurring challenge in organisational change for sustainability (*Hoover and Harder, 2015*), was also identified in the concern repeatedly articulated by key actors that more restrictive measures may prove ineffective due to staff resistance and non-compliance. This can be interpreted as a type of collective action problem, where the distributed agency of a variety of actors limits individual behavioural control, resulting in carbon lock-in (*Seto et al., 2016*).

Another collective action problem can be identified in the larger environment of universities. Universities operate in a competitive environment and key actors in management voiced fears of “falling behind” if acting as an early mover in reducing air travel of staff. Indeed, as *Hoolohan et al. (2021)* already noted, not only individual researchers but also higher education institutions depend on their international reputation and presence, highlighting the need to reconsider mobility expectations more generally in the academic sector. In addition, further institutional elements, such as the definition of performance indicators and legal constraints concerning the use of university funds, limit the university's manoeuvring room. Infrastructural elements such as available rail

connections, booking platforms, and VC tools can constitute further external barriers. Taken together, we can conclude that not only individual researchers but also universities face a certain degree of lock-in with respect to air travel. This conclusion is consistent with those appearing in the literature on carbon lock-in, which has traditionally emphasised how organisational actors face techno-institutional lock-in (Seto *et al.*, 2016).

Needless to say, the study we conducted had certain limitations. Firstly, we used a single case-study design, focusing on staff and management at one university. While some of our results, e.g. on the value-action gap or the importance of perceived fairness of measures, are consistent with those from previous research, a more systematic assessment of responses across a number of different universities could yield more robust results. Secondly, we studied responses to potential future measures to reduce academic flying rather than measures that had already been introduced. Previous research has shown that ex-ante and ex-post attitudes towards environmental policies can vary considerably and that policies may be more strongly supported once people have gained experience with them (Murray and Rivers, 2015; Schuitema *et al.*, 2010). In view of the growing number of higher education institutions taking steps to reduce air travel (Kreil and Stauffacher, 2021), an evaluation of their experiences could provide valuable insights for further institutions. Finally, while we focussed on staff mobility, student air travel (e.g. study abroad programmes and international students) also contributes significantly to the carbon footprint of higher education institutions (Arsenault *et al.*, 2019; Shields, 2019). In the future, researchers could explore how travel emission reductions in this area can be encouraged and how students perceive and balance out the tension between achieving their international exchange goals and reducing travel emissions.

6. Conclusion

Overall, our results further underline that academic air travel constitutes a case of carbon lock-in, as evidenced by high levels of problem recognition along with profound concerns over mandatory air travel reductions. Furthermore, while previous researchers have emphasised behavioural and institutional lock-in factors that affect individual researchers, we have shed more light on the ways in which higher education institutions are locked into facilitating the extensive air travel of their staff. This encompasses institutional elements (legal constraints, ranking systems for universities) and also extends to infrastructural framework conditions (available rail connections, booking platforms, VC tools). Nevertheless, overall support for taking steps to reduce air travel is high, especially by means of incentivising alternatives to air travel. It is, however, questionable whether such voluntary measures will suffice to overcome a lock-in situation. Our result that restrictive measures can also find support, if perceived as fair and viable, thus provides important guidance for designing acceptable “hard” interventions. For example, banning certain flights altogether may prove largely uncontroversial where viable alternatives exist, such as VC for practical meetings and train journeys as alternatives to short-haul flights.

In terms of process, we have argued that systemic change rather than individual behaviour change is key to overcome lock-in of academic air travel, but this in turn needs to be pushed forward by the embedded agency of resourceful individuals. However, the fact that agency is not only structurally embedded but also distributed across a variety of different actors (e.g. the rectorate, deans, university-external actors) produces collective action problems that further aggravate the lock-in situation. We contend that dedicated leadership of university management will be key to facilitate broad commitment within the university and to avoid shifting responsibility between different governance levels. While using a participatory approach that allows for bottom-up engagement may prove beneficial, this should not be used for simply pushing responsibility for the implementation of

measures downwards. Achieving broad commitment may serve not only to ensure compliance with individual measures, but to contribute to a cultural shift, questioning established notions of the necessity of frequent air travel for a productive and successful academic career.

Notes

1. Although some emission reductions can be accomplished by efficiency measures, most university policies to reduce air travel emissions amount to reducing air travel as such. Therefore, “reducing academic air travel” is used largely synonymously with “reducing emissions from academic air travel” here.
2. i.e. excluding student assistants, apprentices, independent contractors and external lecturers but including all other academic and administrative staff.

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Supplementary material

The supplementary material for this article can be found online.

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