

# Gender and diversity in transport

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## Session XII: Gender equity in education and research for transport

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Gender and diversity in transport research in Europe

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### Abstract

The paper explores gender and diversity in transport research. Despite recent initiatives to address gender gaps in STEM and support women in research, most research outputs and investigations are led by men. Taking a systems-oriented approach, using qualitative and desk-based research, the authors argue that gender and diversity bias in research is symptomatic of a wider malaise in the Transport Business Ecosystem (TBE). This not only effects women's research footprints but more importantly the direction of transport research.

### Introduction

Transport and transport research have, for many decades, been dominated by STEM disciplines and approaches, which are traditionally fields dominated by men. Transport innovation has led to cheaper, faster, cleaner, more efficient, greener and safer vehicles and in some cases better infrastructure. However, until the advent of the new mobilities paradigm (Sheller and Urry, 2006), environmental, social and cultural concerns transport has focussed too narrowly on improving the movement of vehicles.

Smart mobility, with its zero vision targets (European Commission, 2021) requires new players, new ways of thinking and a more integrated approach to considering transport not only as part of a system of systems, but one which has negative economic, environmental, health and well-being consequences. Whilst technology innovation remains a key factor in meeting future challenges, it is now time to link transport to wider issues and open up new patterns of thinking. The gender gap in transport is only reducing slightly, with women forming, at best, under 27% of the workforce, and

mostly being confined to nonexecutive positions. The roots of Smart Mobility lie in the traditionally male-dominated STEM (Science, Technology, Engineering and Mathematics) subjects such as computing, engineering, manufacturing and planning. These have become associated with fractured and gender-biased Transport Business Ecosystems, that, if left unchecked, will impede the ability to deliver equitable transport. Women's participation, in particular in engineering, remains low in most European Union (EU) countries: in 2012, graduates in STEM-related subjects accounted for 12.6% of female graduates as compared to a share of 37.5% among male graduates (Caprile et al, 2015) While the contribution of those from diverse and ethnic backgrounds is largely ignored.

Despite evidence of the benefits of diversity, gender equality legislation, emphasis on inclusion of gender and diversity in transport calls, gender mainstreaming tools, and initiatives to recruit women into STEM, progress towards equality and diversity has been slower than expected. Both the transport industry and academia lack diversity, intersectional or interdisciplinary thinking in this wider sense. Current academics, research agendas and innovations work in, on or through projects and environments, guided by the values and research interests of, for the most part, older, white, middle class males. Given this and the culture it promotes, it is not surprising that progress towards greater diversity is slow. The resistance of this group to change not only impedes the career pathways of women, it also reduces the level of understanding of wider mobility needs because there is no tacit understanding or experience of diversity or broader societal needs. Failure to address gender and diversity in the research community, as the Smart Mobility industry is forming, creates barriers to understanding mobility patterns and changes which need to be made.

Key to such a paradigm shift is understanding the preparedness of different stakeholder groups to embrace increasing diversity. Such stakeholders may be local authorities, OEMs, transport providers, legislators and regulators. Preparedness may relate to the availability and willingness to use tools and methods, ability to change, capacity and workforce diversity.

This paper (based on Woodcock et.al, 2020) looks at gender and equality in the EU transport research sector, responsible for setting up and funding research strategies, implementing new transport measures and supporting new researchers. An examination of how it operates, who and what is funded shows the extent to which the transport research community has embraced the necessary changes in its constituency, to enable new ideas and new stakeholders to breakthrough and direct change.

## Method

The research was undertaken by a desktop review of existing material related to women in research in general and in transport research in the EU in particular. This was supplemented by

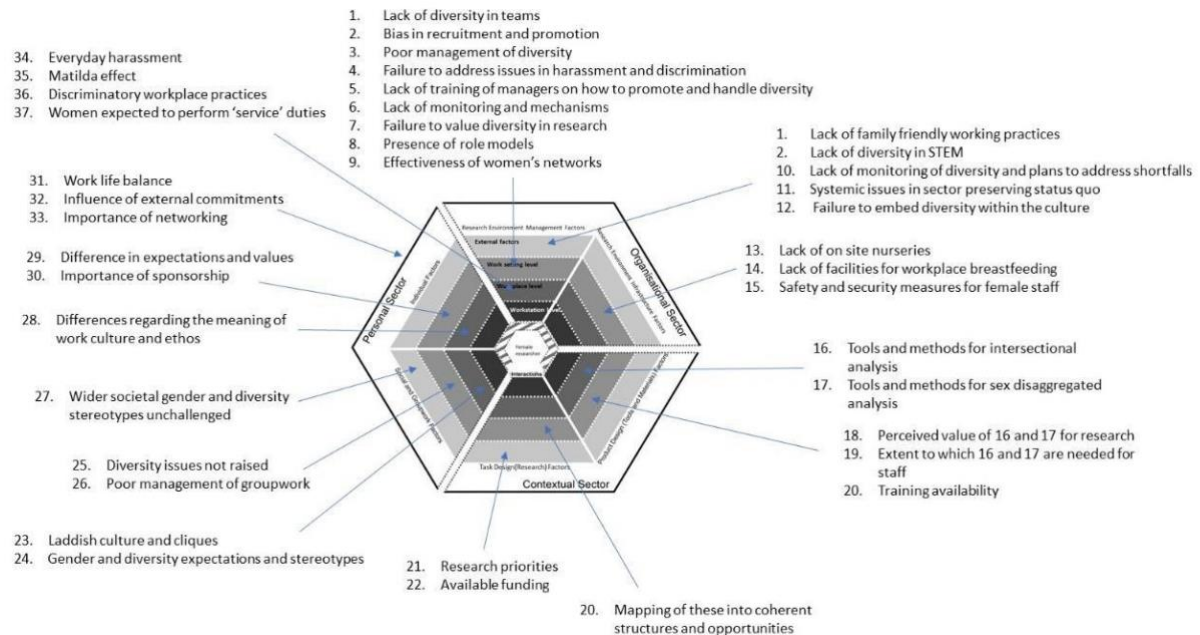
- an analysis of publicly available datasets recently funded EU projects in the mobility sector and,
- an online survey to understand more about the gender dynamics in transport research environments to identify issues that create impediments to women's equal participation in the field.

## Results

The collated results were summarised and mapped on to the Hexagon Spindle Model of educational Ergonomics (Benedyk et.al. and Woodcock et.al., 2009), as shown in Figure 1. This provides a rapid method of distributing the challenges faced by female researchers across organisational, contextual and personal sectors. Notably, many of these issues are the same ones faced by women in the transport industry, pointing to the influence of macro, social and cultural factors permeating the whole sector.

This clustering is a first step towards developing a gender and diversity action plan to ensure a more even playing field. The hexagon-spindle model also asserts that if one aspect of an environment is too problematic, a person, as an active agent will adapt their behaviour to avoid it. For example, to escape a 'laddish culture' in the department, a female academic may choose to work in a quiet place,

in another part of the university or from home; she may dress differently; where her work is undervalued, or a work life balance cannot be created she may seek employment elsewhere. All of these are very real experiences for female researchers. There are personal and professional costs associated with behaviours which challenge the status quo e.g. complaining about behaviour of male colleagues, being unavailable to work at certain time, or not undertaking service duties.



**Figure 1: Overview of barriers to female researcher progression mapped on to the H-S spindle model.**

Many of these issues are not 'job related' or about the design of the immediate work station but are clustered around the outer rings (external and work place setting), in the organizational sector, relating to the management of the research environment, the personal sector.

The findings accord with (*European Commission, 2020*) on the need for structural change in research institutions. Research centres are embedded in HEIs and staffed by those who have succeeded in that environment. They have a vested interest in maintaining the status quo, or systems may be so established that they are hard to turn around. The following recommendations are targeted at providing an inclusive research environment which is more conducive to (gender) diversity and can consolidate and speed up progress, and the level of influence women and those from more diverse groups can have on research and innovation.

### Recommendations

In line with systemic design research approach which pervades much of TInnGO's work, we do not see quick or piecemeal fixes as necessarily appropriate in providing the paradigm shift needed. Transport research needs to be considered in the context in which it takes place, it can lead by example, but it must be supported by institutional changes. For example,

#### In Higher Education Institutions

- ◆ Transfer best practices to create an environment welcoming for women eg eliminating gender pay gap, understanding the female pipeline and progression, create mentorship programmes, reduce gender bias in recruitment, ensure inclusivity of all events, develop non prejudicial complaints procedures,
- ◆ Perform a Gender and Diversity Gap Analysis, develop an action plan and performance metrics

- ◆ Realign core objectives to develop a more holistic approach to cultural diversity (among both staff and students)
- ◆ Reduce disproportionate allocation of service duties

#### **For research centres**

- ◆ Reduce motherhood penalty
- ◆ Actively increase the research footprint of women
- ◆ Provide training for research managers on how to manage diverse teams and create zero tolerance environments to end discrimination, harassment, and gender bias (such as the Mathilda effect)
- ◆ Ensure all research projects generate, use and provide sex disaggregated data and intersectional analysis.
- ◆ Conduct a capability audit on research staff regarding their familiarization with sex disaggregated data and intersectional analysis and develop training material specific research priorities of the centre.

#### **For funding bodies**

Provide additional training for staff and PIs to supplement the recommendations from, for example, the Gendered Innovations project, the existing Gender Toolkit and H2020 guidelines, relating to understanding the effects of diversity on research questions, methods, analysis and impact, reporting of intersectional activities, use of gender and diversity mainstreaming and using gender and diversity action plans to guide the research and staff development and team management.

In addition, funding bodies could

- ◆ require named and weighted sections on proposals and final reports relating to how gender and other differences have been considered and might have shaped research outcomes; understand the links between the diversity of the team and the research questions to funding success;
- ◆ provide training for evaluators on gender and diversity
- ◆ incentivise gender equitable research consortia
- ◆ record characteristics of research teams and make this available for analysis with greater transparency on award applicants
- ◆ analyse previous proposals to produce recommendations and guidelines on how diversity and intersectionality have been considered. Many person hours are spent in developing proposals, with most being unsuccessful. Nonetheless, this provides a rich data stream which could be more widely shared and analysed.
- ◆ Gender action plan for equality, diversity and inclusion (for example, Research Councils UK (RCUK) action plan 9 which focuses on leading by example through improved diversity in the research councils and review bodies, ensuring that workforce has the skills to act as ambassadors for equality, diversity and inclusion, challenging bias and raising awareness of impact of unintentional bias in RCUK systems, processes, behaviours and cultures; ensuring funding is not influenced by the gender of the applicant or by any other protected characteristics; providing strong leadership to change the culture, practices and makeup of the research community).

#### **Training opportunities**

There is a need for a new qualification/level of competence for those wishing to lead research teams and projects. Gaining a postgraduate qualification indicates that the holder may have expertise in an innovative/interesting area. Subsequently, research management skills are 'picked up along the way' e.g. through mirroring behaviour of supervisors, attending ad hoc courses, learning by trial and error. Given the level of investment in research, the need for impact, wider diversity and, and the barriers (female) research staff face in fulfilling their potential, the final recommendation is the development

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<sup>9</sup> <https://www.ukri.org/files/legacy/skills/action-plan-edi-2016/>

of an EU wide research competency framework, leading to a named qualification (based on a portfolio of practice) which would provide training and mentorship for those wishing to be research leaders. Specific areas could focus on sex, gender and intersectional analysis, management of diverse team and wider PI skills.

### Conclusions

The EU research community has shown its commitment to improving gender equality. The transport and mobility calls stress the need to take into account gender related issues. This should be extended to considering wider diversity issues and further analyses could be made of previous projects to identify further activities and trends.

Unfortunately, our research has shown that top down approaches and best practices are reduced in their effectiveness by gender inequalities and lack of diversity which pervade the wider educational system, and STEM related research in particular. The paper has presented a series of recommendations on how this can be addressed, to improve the research culture for the next generation of female researchers.

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