

Scrutinizing the (gendered) norms of the *engineer* as paradigmatic homo technologicusⁱ

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1. Introduction

This paper looks at how the *figure of the engineer* is constituted in discursive practices of distinction within the area of renewable energies in order to gain an understanding of the gendered norms associated with the engineer as paradigmatic homo technologicus. The latter is discussed as being of rising importance within the sciences and scientific research and, thus, as becoming influential with regards to the gender relations within academia.

Considering the entanglements of technological development and scientific research, such as the employment of technical artefacts in the sciences, some voices within STS discuss the partly disparate unity of science and technology and its gender dimensions under the term “technoscience(s)” (Haraway 2000 [1985]; Wajcman 2007). Focussing predominantly on socio-material practices and artefacts this discussion has paid little attention to the intertwining of technological or engineering epistemologies and scientific work. That is, what are the belief systems, orders of knowledge and social norms, such as gender norms, conveyed by engineering practices and technical artefacts that are thereby transported within the realm of the sciences? One approach to discuss the effects – and possible gender effects – of a ‘technologization’ of science and scientific research that is proposed in this paper, is to look at the figure of the so-called “homo technologicus”ⁱⁱⁱ and its gender norms.

Theoretically approaching this topic from the perspective of poststructuralist subject theory, especially following Judith Butler (2008 [1990]), I perceive of the “homo technologicus” as a specific subject positions. As a subject position it is to be understood as a cultural category that pre-shapes the ways individuals are seen and evaluated as well as how they get to recognize themselves as a specific subject. Thereby, such subject positions or cultural categories are associated with a set of (gendered) norms with which individuals must comply in order to be “intelligible” that is socially recognizable and acceptable as the subject in question. From this follows to look at the norms of intelligibility associated with the “homo technologicus” and to analyse how they correspond with social gender norms in order to understand the gender effects of this subject gaining importance within scientific research.

2. The engineer as flexibly gendered and variably constituted homo technologicus

The professional orientation within the realm of technology is often described as “higher, faster, further!” as do Kristina Binner and Susanne Kink with regard to the so-called “homo

technologicus". This assertion seems convincing at first glance as it reminds us of techn-utopian ideas, but falls short with regard to research within Feminist Technology Studies as well as Engineering Studies. Both very strongly reject the idea that there is one single, monolithic and stable idea of technology, doing engineering or the engineer itself. Throughout its establishment as engineering science in the German-speaking area engineering has first been considered a cognitive, highly rational endeavour, before it has been reconceptualised as an application-oriented activity based on tacit knowledge (Paulitz 2012). Others have pointed out the diversity of masculinity constructions within technology that are intertwined with quite disparate understandings of doing engineering respectively technology. While the management oriented masculinity of the engineer in leading positions draws on economic power (Faulkner 2007), the white collar masculinity of engineers is constituted in contrast to the blue collar masculinity of mechanics by drawing on the dualism of mind vs. body (Cockburn 1985; Wajcman 1991). From these exemplary insights follows that the figure of the "homo technologicus" needs itself to be made the object of a sociological as well as gender research if we are not to reproduce stereotypical and monolithic images of the "homo technologicus" as for instance the "nerd".

Consequently, I argue to first ask, what characterizes doing technology or doing engineering? What are the professional norms that constitute the subject of the *engineer* as the paradigmatic "homo technologicus"?^{iv} And, which gender norms shape the engineering subject? This means to empirically and context-specifically analyse how engineering is conceptualized, how the logic of doing engineering or technology is described, and, how the figure of the "homo technologicus" looks like?

3. Engineering in the area of renewable energies

In order to shed some light on the questions posed above and, thus, gain some understanding of what it means to do engineering or work technically that are considered increasingly influential for scientific work, I am drawing on own empirical data. In the context of a larger project that has focussed on the gendered construction of the engineer in the German-speaking area of renewable energies I have conducted qualitative in-depth interviews with men and women, trained as engineers and occupying leadership-positions within companies that operate in the area of renewable energies. These interviewees can be considered as "gate keepers" as they decide who to hire or promote as an engineer and how to strategically develop their companies and their products. With the area of renewable energies these engineers are further to be positioned within a field that is historically rooted in the social and environmental movements of the 1970s, that has a strong tradition of laymen's and activists' activities and that originates in the utopian vision of transforming not

only our energy production but also our society ‘as a whole’ (Mautz, Byzio & Rosenbaum 2008).

As mentioned above, I am drawing on Butler’s (2008 [1990]) feminist and poststructuralist subject theory in order to look at how the gendered subject of “the engineer” is discursively constituted. In order to analyse the power relations inherent to “the engineer”, I am selectively combining Butlers’ subject theory with field-theoretical perspectives as Tanja Paulitz (2012) had proposed in her “genealogical sociology of science”. Thus, I am looking at the *discursive practices of distinction that constitute the figure of the engineer* and interpret them with respect to the relative positions of their actors within a social field. In analysing the interviews I am following Anselm Strauss’ and Juliet Corbin’s (1996 [1990]) proposal for a Grounded Theory. I thereby focus the data analysis, firstly, on discourse-theoretical questions such as what is made discursively relevant and what is not mentioned; secondly, I search for correspondences between professional norms and gender norms in order to reconstruct the gender coding of the figure of the engineer.

Throughout the rest of this paper I will point out two aspects of my empirical findings: first, how engineers in renewable energies discursively constitute “doing engineering” and, thus, their professional activity; second, how engineers constitute “the technical”, that is, the very professional core or object of their profession.

3.1. “Doing engineering” as serious, reliable and structured activity based on an instrumental rationality

When I asked my interviewees what it means for them to work as an engineer within the area of renewable energies, I was confronted with a somehow unexpected pattern of answer. To my surprise all of my informants strongly objected to the idea of there being anything special or distinct about doing engineering within renewable energies. On the contrary, they all wanted it to be perceived as “just the same” as in any other field of engineering activity. Taking a look at four exemplary quotes from two interviews – one with the chief technical officer (CTO) of a company building biodiesel plants (U2_FP_01) and one with the head of research and development of a company operating in the solar energy business (U4_FP_01) – I want to reconstruct how “doing engineering” is described in these interviews constituting the norm of engineering as a professional activity.

The volume of our projects in itself – the volume of each project we work on amounts to several hundred millions of euros. That means, you just have to work as it is custom in the conventional area. That is, you have to well structure your projects, you have to work very diligently, you have to produce plans, documents, papers that meet the standards. And insofar the work itself is very close to the norm. (U4_FP_01: 166-178)

Our tasks are also very much engineering tasks. We are not in touch with cute animals or anything the like. For us the sun is simply a supplier of energy. It is not glorified or anything the like. We try to convert energy, solar radiation into heat radiation, transportable heat that is then burnt in a turbine. Thus, that is all not really romantic. (U4_FP_01: 1491-1502)

There has never been any alternative quality and still is not. This is just very sincere plant engineering, in terms of work activity comparable with the oil industry that is much more conservative in its approaches; however, it primarily is a pure engineering activity. (U2_FP_01: 52-60)

All the interviewees sketch an idea of engineering that projects it as being a “sincere”, “well structure[d]”, “diligent” and reliable activity that is based on an instrumental approach towards nature. Whereas the second quote conveys the notion of an allegedly “alternative” approach against which the engineering activity is portrayed in contrast, this idea of an “alternative quality” is made explicit in the last quotation. Asked for what he understands as “alternative quality”, the interviewee answers:

That is, wearing Birkenstock and long hair [laughing] that is what I mean by it. That is that alternative approach. But here it is a two-fisted business as it is everywhere. That is what I wanted to express. It is not like: we are all fond of each other and everything is nice what we do here. On the contrary, it is well structured just as in every other company. Without that it wouldn't work. (U2_FP_01: 69-80)

The contrasting image of the alleged “alternative” to the proposed ‘normal’ engineering is described by both interviewees in a romanticized way, portraying it as normative, emotional, unproductive and expressive in its approach towards nature. This idea is not only laughed upon – as in the quote above – and, thus, devaluated, but also feminized within the interview data, as women are described as being rather normatively oriented in their work choices and more environment-friendly. The before quoted interviewee for instance states with regards to the gender relations in his company:

I think that there is a tendency that it is very very important for women to work in an area that makes them feel to participate somehow positively in the development of our society. (.) I guess this is also important for men, (.) but (.) I see women a bit more selective in that sense. [...] And this is probably why we do have more women in the area of alternative energies than in the oil industry that is in the classic fossil area. (U2_FP_01: 936-952).

In this quote as in other parts of my data women are positioned within the area of renewable – respectively alternative – energies and are associated with characteristics such as being normatively oriented that have before been used to describe the contrasting and devaluated notion of the “alternative”. Thus, this latter image is associated with femininity, while the image of engineering itself is not gender marked. Considering the mode of constituting the engineering activity by contrasting it to the image of an allegedly alternative notion of engineering activity or work, I argue that the idea of engineering is implicitly coded masculine. The – although implicit – association of engineering with masculinity aligns the former then with notions of professionalism, productivity and instrumental rationality.

3.2. “The technical” as narrow focus on artefact design

When it comes to describing their daily work, almost all of my interviewees mention that they would not consider most of their duties as being “technical”. Asked for what they would consider as being “technical” aspects of their work, they – surprisingly – had considerable difficulties in describing “the technical” and for the most part withdrew to definitions ex negativo. The chief executive officer (CEO) of a company producing biomass heating systems for instance tells me:

Everything that is not, everything where I am not specialist but rather or partly manager, (.) is non-technical for me. Thus, as soon as I am entrepreneur or do the usual managing, for me is non-technical. Because then it is about leadership, about making decisions, about bringing something about, demanding and promoting and so forth. (U1_FP_01: 1490-1501)

As this exemplary quotation shows, “the technical” is foremost described in distinction to management and entrepreneurship; it is *not* leadership, making decisions, interacting with personnel, but it is about being a “specialist”. Looking at further data the notion of the “specialist” can be specified as the idea of having a deep understanding of the laws of physics, of cause-and-effect-relations and of translating these laws into concrete design choices concerning a technical artefact or a technological solution of some kind. Thus, “the technical” – that is the very professional core of engineering – is – on the level of content as well as with respect to the mode of its discursive constitution – limited to the aspect of designing an artefact according to laws of physics, excluding as it seems almost everything else from employees and strategy, to users and social norms of acceptance. All the latter aspects are described as non-technical and thereby excluded from the realm of “the technical” and framed as context variables or marginal conditions. Within my data this core notion of “the technical” is again coded masculine – this time explicitly – as men are described as being more interested in technical choices and women as being more sensitive to the so-mentioned surrounding or marginal aspects of doing engineering or designing an artefact (see for a more extensive discussion Prietl 2016).

4. Conclusions: (implicitly) reinforcing established images of the engineer and its gendered norms

Taking these two selective empirical findings together and considering further findings that I could not elaborate on in this paper, the notion of “doing engineering” as professional activity and “the technical” as professional core discursively constituted by my interviewees can be described with the following attributes: professionalism, productivity and instrumental rationality with a rather narrow focus on the development of technical solutions. This professional self-understanding of engineers is developed in contrast to ideas of an

“alternative”, normative and expressive approach as well as opposed to notions of management and entrepreneurship.

The latter is very interesting with regards to literature that understand current processes of transformation of academia and academic research as “economization” (among others Münch 2011; Slaughter/Rhoades 2004) and depict the rise of the so-called “entrepreneurial scientist” (Etzkowitz 1998). This new academic subject is described as operating in the context of an “academic capitalism”, perceiving research as a competitive business and being oriented towards the newly implemented structures of benchmarking, rating and ranking. Considering the discursively constituted opposition of “the technical” and “the entrepreneurial” by my interviewees, I think it is necessary to further analyse the interdependencies between these two figures – the “homo technologicus” and the “entrepreneurial scientist” – as well as the entanglements of these processes of economization and technologization of science.

Returning to the question posed at the beginning of this paper, I want to give some preliminary thoughts on how the rise of the “homo technologicus” might affect scientific research and gender relations in the sciences. First, a technologization of science might very well mean the transportation of technical or engineering norms into science instead of the reformulation of the former just as doing engineering in the area of renewable energies and, thus, within an area that has historically promoted diverse and different ideas of doing technology, obviously does not lead to questioning concepts of engineering established in conventional areas of engineering activity, but rather fosters their strong embracement. Consequently developments within scientific research might find stronger support that apply a narrow focus on concrete objects of study, excluding context as of little relevance, and that are based on an instrumental rationality instead of on expressive and normative approach. Second, similarly to the masculine coding of the engineering subject in my data, the “scientific homo technologicus” might transport a masculine gender coding that may as well be rather implicit than explicit, making it harder to detect and criticize. Finally, from these very preliminary ideas follows the need to take into account, how new concepts of the scientist – possibly as “homo technologicus” – are understood, how the profession and its professional core are defined, what is excluded as unprofessional or irrelevant and how these differentiations are linked with gender differentiations.

References

- Butler, Judith (2008 [1990]), *Gender Trouble*, New York, London: Routledge.
- Cockburn, Cynthia (1985), *Machinery of dominance: Women, men and technical know-how*, London: Pluto Press.
- Etzkowitz, Henry (1998), The norms of entrepreneurial science: cognitive effects of the new university-industry linkages, *Research Policy* 27: 823-833.

- Faulkner, Wendy (2007), 'Nuts and Bolts and People': Gender-troubled Engineering Identities. *Social Studies of Science* 37(3): 331-356.
- Haraway, Donna (2000 [1985]), A Cyborg Manifesto. Science, Technology and Socialist-Feminism in the Late Twentieth Century, in Bell, David and Barbara Kennedy (Eds.), *The Cybercultures Reader*. New York, London: Routledge, 291-324.
- Mautz, Rüdiger, Andreas Byzio and Wolf Rosenbaum (2008), *Auf dem Weg zur Energiewende. Die Entwicklung der Stromproduktion aus erneuerbaren Energien in Deutschland*. Göttingen: Universitätsverlag Göttingen.
- Münch, Richard (2011), *Akademischer Kapitalismus. Über die politische Ökonomie der Hochschulreform*. Berlin: suhrkamp.
- Paulitz, Tanja (2012), *Mann und Maschine. Eine genealogische Wissenssoziologie des Ingenieurs und der modernen Technikwissenschaften, 1850-1930*. Bielefeld: transcript.
- Prietl, Bianca (2016), Der Ingenieur als technisch kompetenter und sozial versierter Manager. Vergeschlechtlichte Konturen eines Berufsbildes. *Berliner Debatte Initial* 27(1): 58-69.
- Slaughter, Sheila and Gary Rhoades (2004), *Academic Capitalism and the New Economy*. Baltimore, London: Johns Hopkins University Press.
- Strauss, Anselm and Juliet Corbin (1996 [1990]), *Grounded Theory: Grundlagen Qualitativer Sozialforschung*. Weinheim: Beltz.
- Wajcman, Judy (1991), *Feminism Confronts Technology*. University Park: Pennsylvania State University Press.
- Wajcman, Judy (2007), From women and technology to gendered technoscience. *Information, Communication and Society* 10(3): 287-298.

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ⁱⁱⁱ The term „homo technologicus“ has been proposed by the organizers of the session „The Scientific Homo Technologicus – Reinforcement or Break-Up of Gendered Norms?“, Kristina Binner and Susanne Kink.

^{iv} As the shortly sketched literature above shows there are diverse figures within technology, among which the engineer is only one – but one of considerable importance and influence at least in the German-speaking area, which is why I am focussing on the engineer as *one* paradigmatic “homo technologicus”.