

Strengthening the self- and external perceptions of young women STEM professionals (YWSP) during career entry and advancement – a research project outline

Short paper (Preprint)

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ABSTRACT

This short paper outlines a project that explores the influence of the self- and external perceptions of young women STEM professionals (YWSP) at the time of their career entry and advancement. The empirical basis for the project is 72 in-depth interviews, which will be conducted in different regions of Germany with women entrepreneurs and women managers in STEM fields as well as with other experts and stakeholders. Additionally, existing statistical data concerning the occupational situation YWSP in Germany will be analyzed. The objective of the project is to identify the opportunities, challenges, and barriers that YWSP face, especially the role perceptions play in this regard. In doing so, we aim to achieve a better understanding of the situation of YWSP in Germany. By accurately deriving recommendations for actions, we aim to contribute to increased gender equality and an increased number of high-qualified women in the male-dominated STEM areas.

CCS CONCEPTS

• **General and reference** → **Document types** → Surveys and overviews

KEYWORDS

Women entrepreneurs, female managers, STEM, stereotypes, perceptions, career entry, career advancement

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1 INTRODUCTION

With increasing digitalization, the German government strives to become the top digital growth country in Europe. Therefore, highly qualified junior staff are needed in the natural sciences, technology, and especially in the information technology sector. Hence, the potential of young women should be fostered and implemented in the German culture of innovation. The German government has already funded and supported several initiatives and projects to increase the participation of women in (mainly academic) STEM fields [2]. All STEM fields (science, technology, engineering, and mathematics) have in common that they are still male-dominated areas.

The data provide evidence that women are still less likely to choose a qualification or an occupation in those STEM fields [1, 6]. Actually, in the 2016/2017 winter term, only 32 % of all elementary students in STEM fields that started their qualification at German universities were female [6]. According to women who are employed in STEM fields, the ascertained figures, for example, in informatics and other ICT professions (information and communication technology), are even worse: Here, the proportion of women is only 15.8 %. In contrast, the proportion of females in natural science professions, such as mathematics, biology, chemistry, and physics, seems relatively high at 37 % [1]. These data show that few women dare to take the step of registering for STEM studies and pursuing a college degree in this future-oriented area, and even fewer women actually work in STEM professions. Even if women study STEM subjects, they are less likely to take a job appropriate to their qualifications afterwards [9].

STEM fields experience a large pipeline leak with regard to women: The higher the educational or professional level in STEM fields the less women participate in it. With regard to leadership positions, for example, only 15 % are filled by women [5]. STEM fields as well as business ownership and leadership careers have in common that they are perceived as masculine areas [3, 8]. For women entrepreneurs, existing research shows that females operate in a social space that is unsympathetic to their gender [5], which appears to intensify with regard to business ownership in STEM, as research on women

entrepreneurs in high-technology fields demonstrates [7]. Furthermore, we know from former studies that perceptions play an important role in this regard, although their influence, especially on the career entry and advancement of young women STEM professionals, is less well understood.

2 THE RESEARCH PROJECT

2.1 Objective

Keeping in mind the increasing need for highly qualified specialists in STEM fields as well as the underrepresentation of women in those areas, we explore the career entry and career advancement of young women managers and women entrepreneurs in STEM fields, especially the role self- and external perceptions play in this regard. For that purpose, we are conducting a government funded, three-year research project that began in April 2017.

Initially, we investigate the occupational situation of highly qualified young women in STEM fields, the so-called young women STEM professionals (YWSP). We concentrate on both young women managers in SMEs, because SMEs play an important role in the German economic landscape, and women entrepreneurs, because entrepreneurship displays another kind of career advancement for high-qualified women, in order to identify the opportunities, challenges, and barriers the women face in the male-dominated STEM area. We focus explicitly on career entry and advancement because these seem to be particularly critical stages in the career paths of women in STEM. Therefore, we emphasize both the self-perception of young women STEM professionals and the perception of others regarding YWSP: We investigate how YWSP see themselves, how others see them, and how these perceptions differ. This enables us to determine how perceptions may influence the career paths and the occupational situation of YWSP.

Ultimately, the objective of our investigation and therefore of our research project is to analyze the career paths of YWSP, identify the possible reasons for their underrepresentation, and consequently derive recommendations for action. In doing so, we contribute to the strengthening of the self- and external perceptions of young women managers and women entrepreneurs in STEM fields during career entry and advancement. It is not yet clear to what extent our results cover the situation of the whole "STEM field" or what kinds of results just refer to specific parts of STEM (e.g., the ICT sector). Our empirical investigation will clarify this question. If the initial empirical results indicate an additional benefit of adding small focus groups as a useful further empirical instrument, we will expand our methodological toolbox. As an overarching goal, our project aims to contribute to enabling equal opportunities for women [2].

2.2 Method

We conduct a qualitative, empirical investigation using 72 in-depth interviews. The interviewees will be found through network partners, existing contacts and a snowball system. The

investigation will occur in different regions and contextual environments in Germany. This will help us to contextualize our results, conclusions and recommendations. In each contextual framing, we will conduct interviews with women entrepreneurs and women professionals who are employed in STEM fields. Among others, we address the following questions: What did the previous career paths of women in STEM look like? Which challenges did YWSP face during career entry and advancement, and how did they handle those challenges? What enabled or inhibited a higher career level? Who influenced their career paths and how? How do YWSP see themselves? How do others perceive them? Additionally, we will conduct interviews with employees and managers in STEM fields in order to gain insights into how others perceive YWSP in this male-dominated area. With the help of expert interviews, we will gain a professional, external view of the occupational situation of YWSP. Taking into account statistical data concerning the occupational situation of young women STEM professionals in Germany will help us to contextualize our findings and recommendations for action.

3 RESULTS

The empirical investigation started in December 2017 and the first round of qualitative interviews will be finished by the end of February 2018. Therefore, by May 2018, we will have finished the transcription and analysis of the first interviews, and we will be able to present the first results. The quantitative investigation, which has already started, will be finished in spring 2018. Hence, we will also be able to present the complete results from the analysis of the existing data concerning the occupational situation of young women STEM professionals in Germany.

The first impressions from our interviews indicate that women in STEM themselves have the notion that they have to demonstrate their abilities to a greater extent than men to be respected. However, once they are respected, they feel that they are treated as equals with the men. Many interviewees indicate that they need to adapt themselves to the male-dominated culture within their professional field; if they experience problems, it is judged to be their fault, not a problem of the environment. A good way to address problems seems to be to both feel and show self-confidence. Some women indicated that there are not only challenges but also opportunities of being a female in male-dominated environments, e.g., being admired and respected for one's career path. Generally, the context and support of others within a specific context seems to play an important role – which may be more important than the interviewees' abilities. A contextual framework is characterized by manifold facets; it can be, for example, the regional, professional or industry-related context. In relation to the regional context, we experienced, for example, that it was much easier to find women founders in STEM fields in more urban regions than in rural regions.

Further investigations of these and additional cases will determine whether the insights revealed in the case analyses so far may be crystallized as more general patterns.

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